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RUN

THE COMMODORE 64/128 USER'S GUIDE

September 1988
An IDGC/I Publication

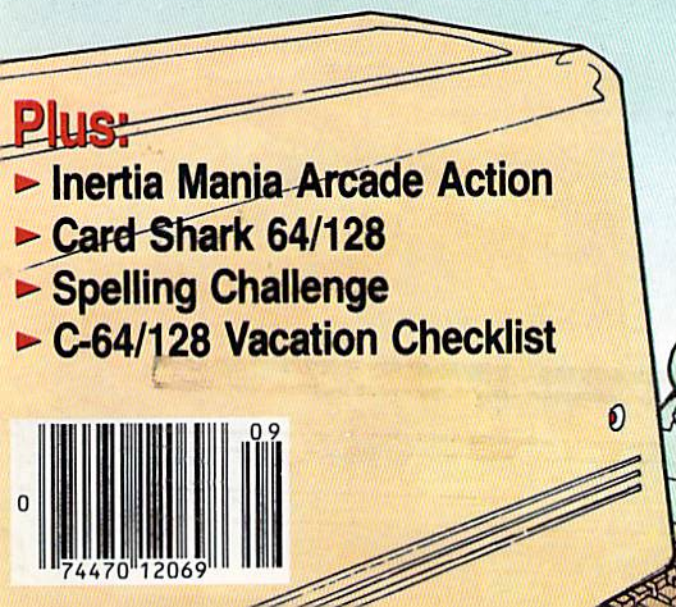
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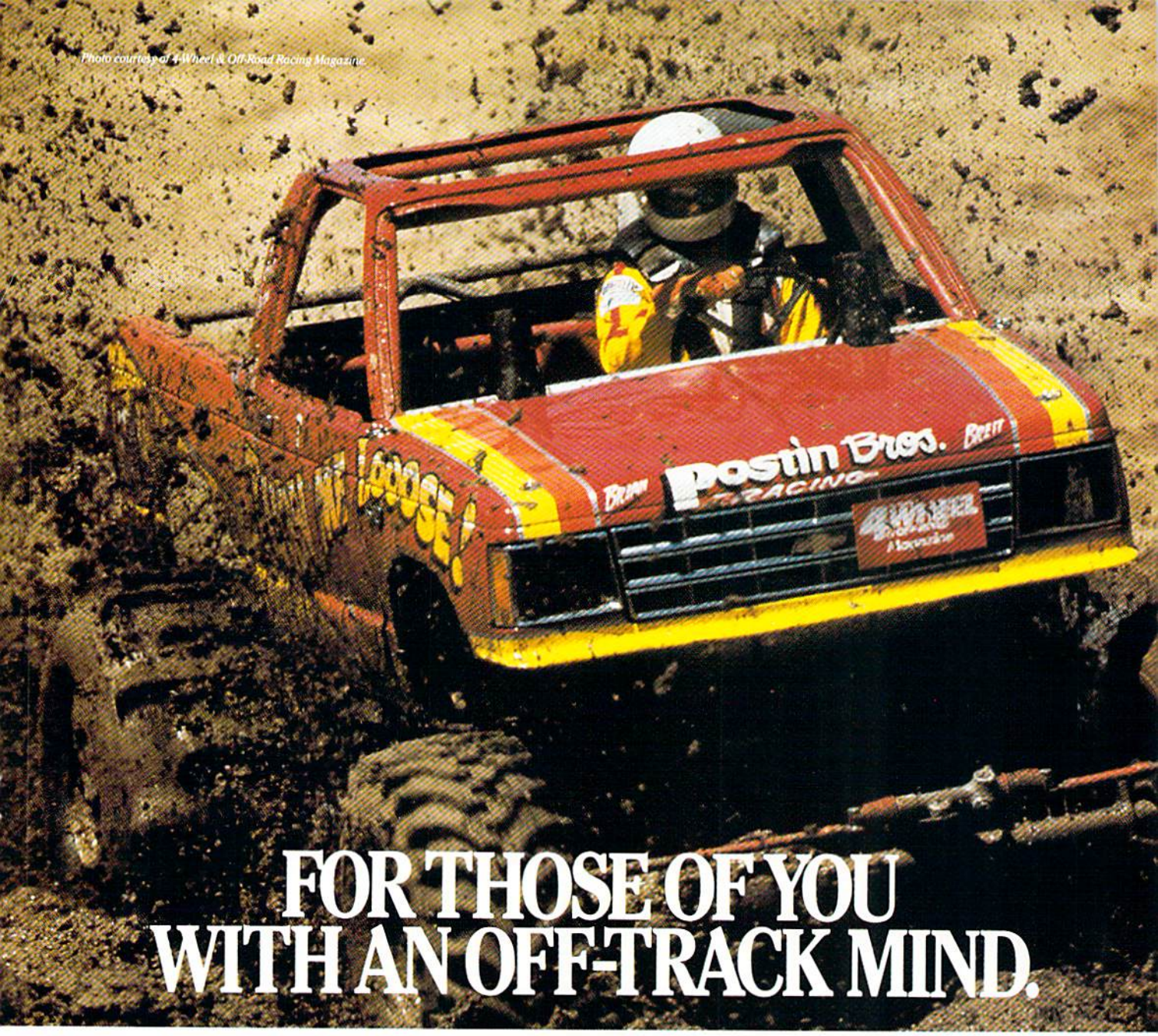
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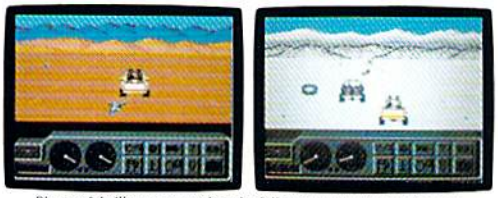
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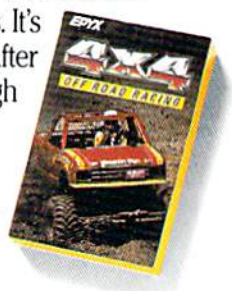


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Contents of Issue #49

- **Power Budget** Keep track of your spending, make projections.
- **Down, Down, Down** Can you survive six levels of acid mines?
- **Robot Rescue** As Mandar II, rescue our ambassadors from the Vordax.
- **Notepad** Two text screens for notes.
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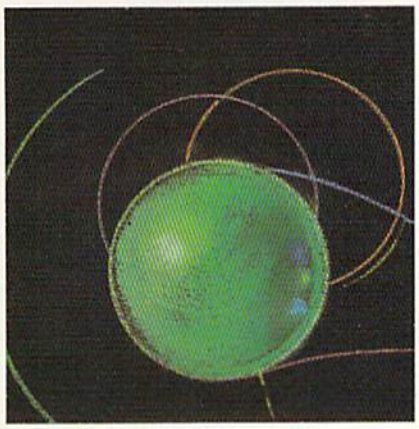
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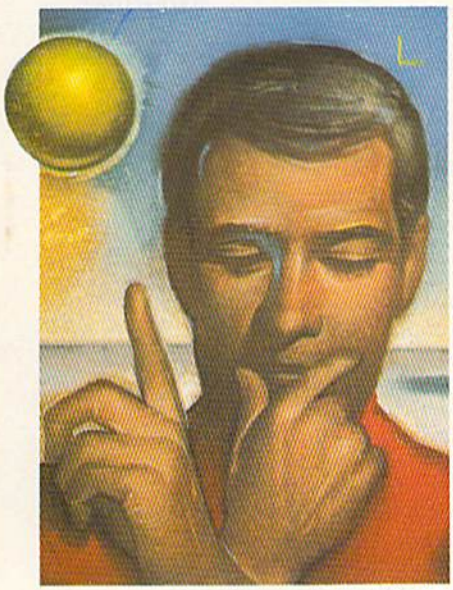

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C O N T E N T S

VOLUME 5, NUMBER 9 SEPTEMBER 1988



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COVER ILLUSTRATED BY ISTVAN BANYAI

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PUBLISHER
STEPHEN ROBBINS

EDITOR-IN-CHIEF
DENNIS BRISSON

MANAGING EDITOR
SWAIN PRATT

SENIOR EDITOR
BETH S. JALA

ASSOCIATE EDITOR
HAROLD R. BJORNSEN

TECHNICAL MANAGER
LOU WALLACE

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TIMOTHY WALSH

COPY EDITOR
PEG LEPAGE

CONTRIBUTING EDITORS
ROBERT KODADEK; ROBERT ROCKEFELLER; JOHN RYAN

ART DIRECTOR
HOWARD G. HAPP

DESIGNER
ANNE DILLON

PRODUCTION/ADVERTISING SUPERVISOR
RUTH BENEDICT

PRODUCTION ASSISTANT
LAURA JOHNSON

ADVERTISING SALES MANAGER
KENNETH BLAKEMAN

SALES REPRESENTATIVES
NANCY POTTER-THOMPSON
BARBARA HOY

CLASS AD SALES-EAST COAST
HEATHER PAQUETTE
603-924-9471

ADVERTISING COORDINATOR
SUE DONOHOE

CUSTOMER SERVICE REPRESENTATIVE
LISA LAFLEUR

SECRETARY
MARGOT SWANSON

WEST COAST OFFICE:

SALES MANAGER
GIORGIO SALUTI

CLASS AD SALES
DANNA CARNEY

3350 W. BAYSHORE ROAD, SUITE 201
PALO ALTO, CA 94303
415-328-3470

MARKETING MANAGER
WENDIE HAINES

MARKETING COORDINATOR
LAURA LIVINGSTON

BUSINESS MANAGER
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RUNning Ruminations

In a recent report I read, watching TV was listed as America's favorite evening recreational activity. The report failed to disclose how computing fared, but we suspect that computerists are not immune to the couch potato syndrome that is sweeping the nation. Any day now, scientists may warn us that too many hours in front of the computer screen can have a negative effect on your social life and turn you into something akin to a sofa spud.

To help you monitor the number of hours you spend in front of the computer screen, we've devised the following 15 early-warning signs of trouble:

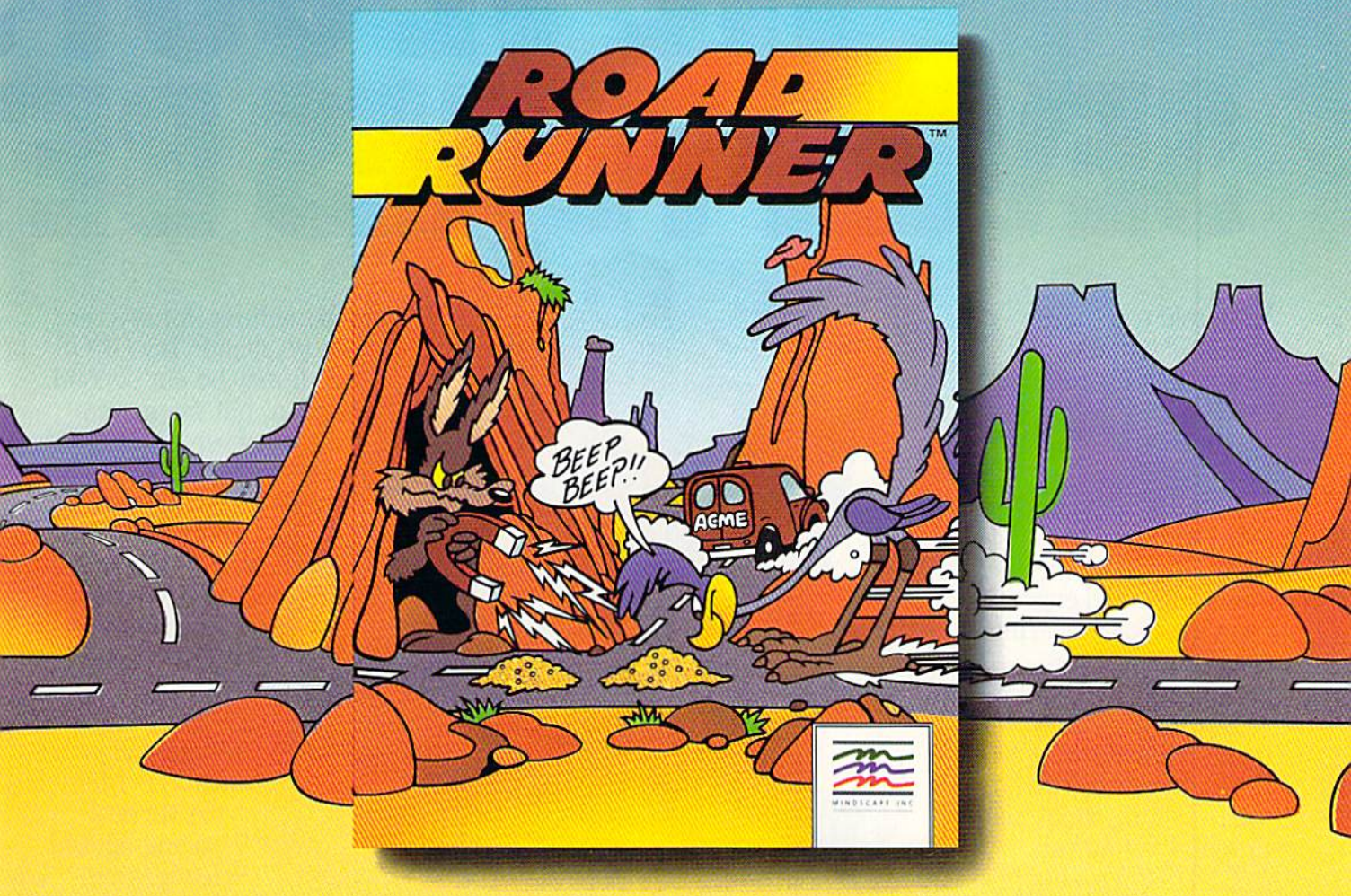
Avoid these early-warning signs of "computer tuber" syndrome.

1. You know the names of all the officers of your local user group, but can't remember the name of your son's second grade teacher.
2. You have the hot-line number of your computer service center tattooed on your forearm.
3. The last book you read was the "Commodore 64 Programmer's Reference Guide."
4. Your idea of a romantic getaway is to pack your car with sheets and sheets of source code for a weekend of debugging in a dimly-lit motel room.
5. You would rather play Platoon on your computer night after night than take your spouse to the movies to see it on the big(ger) screen.
6. Your monthly bill for floppy or hard disks is twice the amount you spent on greeting cards in the last five years.
7. At a restaurant, when the waiter offers to bring you a menu, you think it's something you can pull-down on your computer screen.
8. You've been treated in the last year for computerist's wrist—the painful affliction acquired from using your mouse too much.
9. Your list of important phone numbers includes the number of your favorite computer mail-order company, but not your mother's-in-law.
10. Your telephone bill for one night of telecommunicating would put a huge dent in the national deficit.
11. You can recite countless important Poke commands and kernal routines, but you have a difficult time remembering your wedding anniversary.
12. You have no trouble writing complex sound and graphics programs, but you still haven't mastered how to heat a cup of coffee in your microwave.
13. Your idea of home improvement is adding a new printer to your computer system.
14. You can properly connect modems, printers and interfaces to your computer and easily upgrade your system with new chips, but you get all tangled up trying to string up the lights for the holiday season.
15. You still get excited when you recall the first time you successfully used the computer.



Dennis Brisson
Editor-in-Chief

This little birdie goes beep beep.



GET GOING OR GET PLUCKED!



How fast can you make Road Runner run? It better be very fast because that hungry Wile E. Coyote will catch him sure as sunrise!

Wile will fly his Jet-Pac or his rocket… maybe even his pogo stick will be pressed into the chase. Look out for everything from landmines to cannonballs because Wile E. Coyote is never at a loss for new ways to pluck the feathers of that speedy, lovable, high-tailing bird.





Arcade-style graphics, never ending new antics, colorful scrolling scenery, great sounds make this an enjoyable classic.

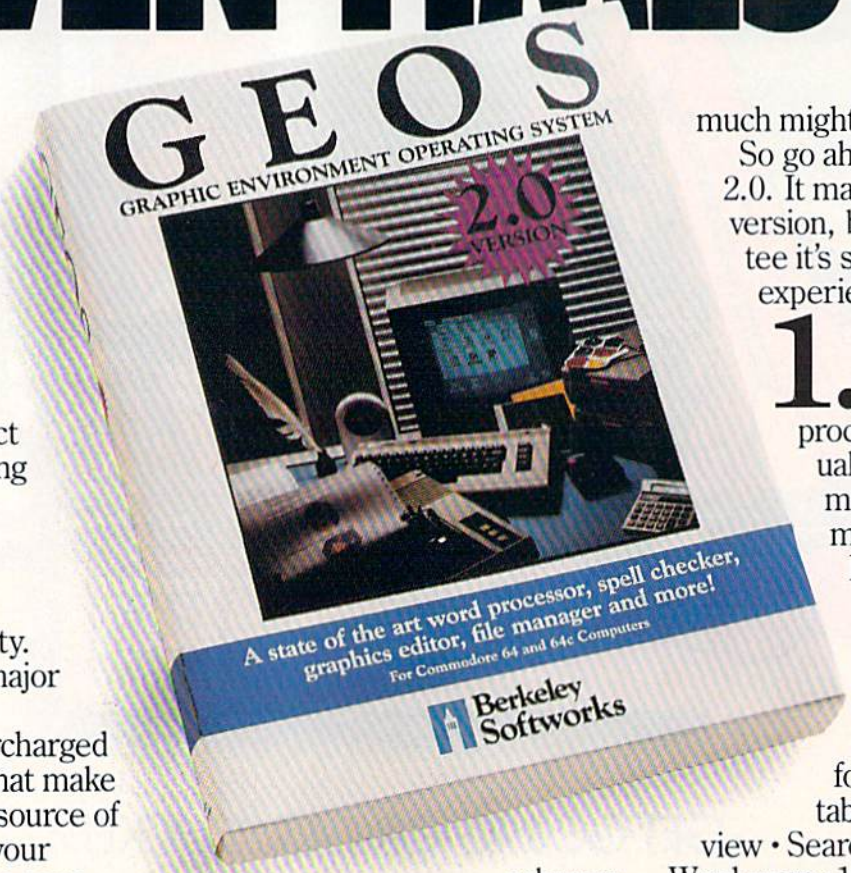


Beep-beep! Pluck Road Runner off the shelf and head for home!

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SEVEN TIMES BE



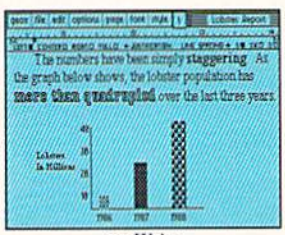
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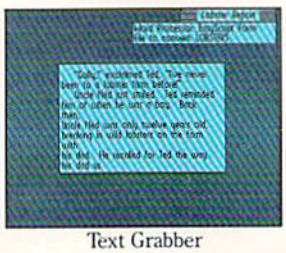
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Not the kind that sends a small surge through your creativity. We're talking about major productivity power.

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geoWrite


Text Grabber


geoSpell

It doesn't even matter if the text is from some other Commodore-based program. Because GEOS 2.0 converts it with one simple point and click.

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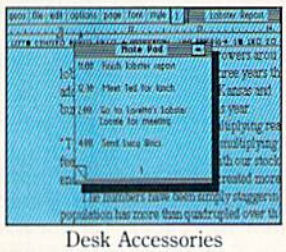
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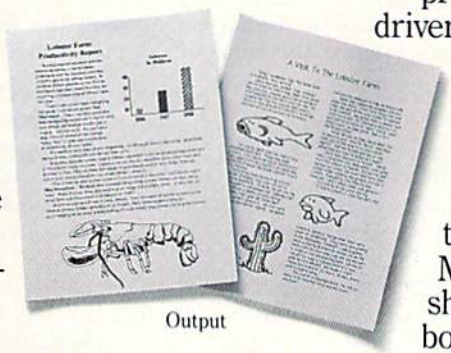


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MAGIC

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Compiled by TIM WALSH

$4C6 C-64 Joystick Reader

Unlike most joystick utilities, which read only one port, my program reads input from both ports when called with a SYS command. Use Joystick Reader as a routine in your own programs, and you'll find this relocatable program to be one of the best joystick utilities around.

If you don't program, you can still use Joystick Reader to test joystick ports and joysticks. Just load and run it. You'll get a demo with a ball on the screen that a joystick in either ►

TRICK OF THE MONTH

$4C7 Autosave 64

I sometimes lose my concentration when I need to save a listing I'm typing in or a program I'm creating, so I wrote Autosave 64, an interrupt-driven utility that automatically scratches, saves and verifies my work for me. I don't even have to memorize the filename.

Type in Autosave 64 with *RUN*'s Checksum and save it. When you're ready to work, run Autosave 64 first. You'll be asked to enter the name of the program, after which you press return when you see SYS 850 appear on the screen.

Now you can start typing. When you want to save the listing, just press the Commodore logo and control keys together. When the cursor reappears, list the program and continue typing. If you're working on a long program, prevent memory conflicts by pressing run-stop/restore, then enter SYS 850 before using Autosave 64.

```
Ø REM AUTO-SAVE 64 - C. J. SIMS    :REM*26
1Ø POKE 644,148:POKE 643,Ø         :REM*52
2Ø FOR A=828 TO 991:READ DT:POKE A,DT:SM=
   SM+DT:NEXTA                     :REM*129
3Ø FOR A=38144 TO 38259:READ DT:POKE A,DT
   :SM=SM+DT:NEXTA:IF SM<>16632 THEN 14Ø
                                   :REM*1Ø3
4Ø INPUT "ENTER FILENAME ->";A$    :REM*235
5Ø X=LEN(A$):IF X<1 OR X>1Ø THEN PRINT "<
   MIN 1 CHR/MAX 1Ø CHRS>":GOTO 4Ø:REM*53
6Ø GOSUB 15Ø                       :REM*136
7Ø LN=LEN(OP$):FOR A=1 TO LN:CHR=ASC(MID$
   (OP$,A,1)):POKE 38161+A,CHR:NEXTA
                                   :REM*73
8Ø LN=LEN(SA$):FOR A=1 TO LN:CHR=ASC(MID$
   (SA$,A,1)):POKE 38197+A,CHR:NEXTA
                                   :REM*65
9Ø LN=LEN(VR$):FOR A=1 TO LN:CHR=ASC(MID$
   (VR$,A,1)):POKE 38234+A,CHR:NEXTA
                                   :REM*211
1ØØ FOR ZP=38162 TO 38256:CK=PEEK(ZP):IF
    CK=Ø THEN POKE ZP,1            :REM*246
11Ø NEXT ZP:POKE 917,149:PRINT "{SHFT CLR
    }{CRSR DN}{2 CRSR RTs}* SYS 85Ø TO IN
    STALL"                         :REM*2Ø1
12Ø PRINT "{2 SPACEs}* C= + CTRL{2 SPACEs
    }TO ACTIVATE"                  :REM*71
13Ø PRINT "{2 SPACEs}* RUN/STOP + RESTORE
     TO DEACTIVATE":PRINT"{3 CRSR DNs}SYS
     85Ø{3 CRSR UPs}":NEW          :REM*2Ø3
14Ø PRINT "ERROR IN DATA STATEMENTS!":END
                                   :REM*146
```

```
15Ø OP$=A$+CHR$(34)+":CLOSE 15:" :REM*141
16Ø SA$=A$+CHR$(34)+",8"          :REM*42
17Ø VR$=A$+CHR$(34)+",8:"         :REM*1
18Ø RETURN                        :REM*67
19Ø DATA 169,32,16Ø,Ø,162,1,153,Ø,4,153,Ø
    ,5,153,Ø,6,153,Ø,7,136,2Ø8    :REM*234
2ØØ DATA 241,96,32,6Ø,3,16Ø,Ø,185,185,3,2
    Ø1,Ø,24Ø,7,32,21Ø,255,2ØØ,76 :REM*171
21Ø DATA 87,3,169,113,141,2Ø,3,169,3,141,
    21,3,234,96,32,12Ø,3,76,49    :REM*57
22Ø DATA 234,234,173,141,2,2Ø1,6,2Ø8,3,32
    ,132,3,96,234,169,49,141,2Ø,3:REM*16Ø
23Ø DATA 169,234,141,21,3,32,6Ø,3,16Ø,Ø,1
    85,Ø,15Ø,2Ø1,Ø,24Ø,7,32,21Ø   :REM*1Ø2
24Ø DATA 255,2ØØ,76,147,3,169,13,141,119,
    2,169,13,141,12Ø,2,169,13,141:REM*1Ø5
25Ø DATA 121,2,169,3,133,198,76,1Ø1,3,234
    ,234,142,19,17,17,17,29,29,29 :REM*98
26Ø DATA 29,83,65,86,69,32,45,32,85,84,73
    ,76,32,32,73,78,83,84,65,76   :REM*134
27Ø DATA 76,69,68,Ø,234,234,Ø,Ø,Ø,Ø,Ø,19,
    79,8Ø,69,78,32,49,53,44,56,44:REM*135
28Ø DATA 49,53,44,34,83,48,58,Ø,Ø,Ø,Ø,Ø,Ø
    ,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø  :REM*46
29Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,19,17,17,17,83,65,86
    ,69,32,34,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø:REM*238
3ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,19,17,17,1
    7,17,17,17,17,86,69,82,73,7Ø :REM*254
31Ø DATA 89,32,34,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
    ,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,19,Ø,Ø,Ø  :REM*139
```

—Cedric J. Sims, Bryan, TX



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port can move about. Press the fire-button to end the demo and list the program to the screen.

```
Ø REM JOYSTICK READER - MICHAEL MYERS
                                        :REM*29
1Ø AD=828:FORJ=AD TO AD+36:READQ:POKEJ,Q:N
   EXT                                  :REM*51
2Ø PRINTCHR$(147):X=1524:POKEX,81       :REM*65
3Ø FB=Ø:JS=Ø:SYSAD:FB=PEEK(253):JS=PEEK(25
   4)                                   :REM*5Ø
4Ø IF FB+JS=Ø THEN 3Ø                   :REM*68
5Ø Y=X:POKEX,32:IF FB THEN POKE 198,Ø:LIST
                                        :REM*121
6Ø IF JS=1THENX=X-4Ø: REM UP            :REM*192
7Ø IF JS=2THENX=X+4Ø: REM DOWN          :REM*18
8Ø IF JS=4THENX=X-1: REM LEFT           :REM*35
9Ø IF JS=5THENX=X-41: REM UP & LEFT
                                        :REM*197
1ØØ IF JS=6THENX=X+39: REM DOWN & LEFT
                                        :REM*224
11Ø IF JS=8THENX=X+1: REM RIGHT         :REM*194
12Ø IF JS=9THENX=X-39: REM UP & RIGHT
                                        :REM*76
13Ø IF JS=1ØTHENX=X+41: REM DOWN & RIGHT
                                        :REM*156
14Ø IF X<1Ø24 OR X>2Ø23 THEN X=Y        :REM*135
15Ø POKEX,81:GOTO3Ø                     :REM*149
16Ø DATA 169,Ø,133,253,133,254,173,Ø,22Ø,2
   Ø1,127,2Ø8,7,173,1,22Ø               :REM*12Ø
17Ø DATA 2Ø1,255,24Ø,16,72,41,16,73,16,24Ø
   ,2,133,253,1Ø4,41,15                 :REM*93
18Ø DATA 73,15,133,254,96               :REM*58
```

—Michael Myers, Beardstown, IL

$4C8 Binary File Examiner

Binary, or machine language, files are saved to disk in addresses that permit them to be reloaded into specified sections of memory. As your programming skills grow, you'll need to know where a file resides before you can load it into memory.

That's where my 64- and 128-compatible program, Binary File Examiner, comes in. Use it to examine any binary file on disk, and it will report the file's starting and ending addresses. It will also report the low- and high-byte pointers to the addresses and the total number of bytes contained in the file.

```
Ø REM BINARY FILE EXAMINER - JOSEPH CHARNE
  TSKI                                  :REM*112
1Ø INPUT"ENTER FILENAME";F$:IFF$="" THEN E
   ND                                   :REM*254
2Ø OPEN15,8,15,"I Ø:":OPEN2,8,8,F$      :REM*183
3Ø GOSUB12Ø:SL=ASC(L$+CHR$(Ø)):SH=ASC(H$+C
   HR$(Ø)):S=SL+256*SH                  :REM*91
4Ø PRINT"{CRSR DN}STARTING ADDRESS= "S
                                        :REM*119
5Ø PRINT"{CRSR DN}LOW BYTE="SL" HIGH BYTE=
   "SH                                  :REM*34
6Ø INPUT"{CRSR DN}DO YOU WANT ENDING ADDRE
   SS (Y/N)";A$:IFA$<>"Y"THEN14Ø        :REM*72
7Ø GET#2,B$:IFST=ØTHENC=C+1:GOTO7Ø:REM*155
8Ø EA=S+C:EH=INT(EA/256):L=EA-256*EH
                                        :REM*125
9Ø PRINT"{CRSR DN}ENDING ADDRESS="EA
                                        :REM*199
1ØØ PRINT"{CRSR DN}LOW BYTE= "L" HIGH BYTE
   ="EH                                 :REM*9Ø
11Ø PRINT"{CRSR DN}TOTAL BYTES OF FILE="C+
   1:GOTO14Ø                            :REM*22Ø
12Ø INPUT#15,E,E$,ET,ES:IFE=ØTHENGET#2,L$,
   H$:RETURN                            :REM*196
13Ø PRINTE;E$;ET;ES                     :REM*75
14Ø CLOSE2:CLOSE15                      :REM*247
```

—Joseph Charnetski, Dallas, PA

$4C9 C-64 Binary File Handler

While the C-64 lacks a BLoad command, you can still easily load a binary file from disk with C-64 Binary File Handler, which lets you load a binary file into any address and then calculates the low and high bytes of the new starting address for you. This routine is also a practical complement to the Binary File Examiner program above.

```
Ø REM C-64 LOAD RELOCATOR - RICHARD PENN
                                        :REM*185
1Ø INPUT"FILENAME";A$:A$=A$+",P,R"      :REM*31
2Ø INPUT"NEW STARTING ADDRESS";SA:H=INT(SA
   /256):L=SA-(256*H)                   :REM*11Ø
3Ø OPEN 1,8,1,A$:POKE185,Ø:POKE78Ø,Ø:POKE7
   81,L:POKE782,H:SYS65493:CLOSE1       :REM*189
```

—Richard Penn, Montreal, Quebec, Canada

$4CA C-64 DOS 5.1 Auto-Copy

Ask C-64 users which disk utility they rely on the most, and they'll probably tell you Commodore's DOS Wedge (DOS 5.1). It comes on the 1541 and 1571 Test Demo disks and shortens the lengthy syntax of disk commands to a few characters.

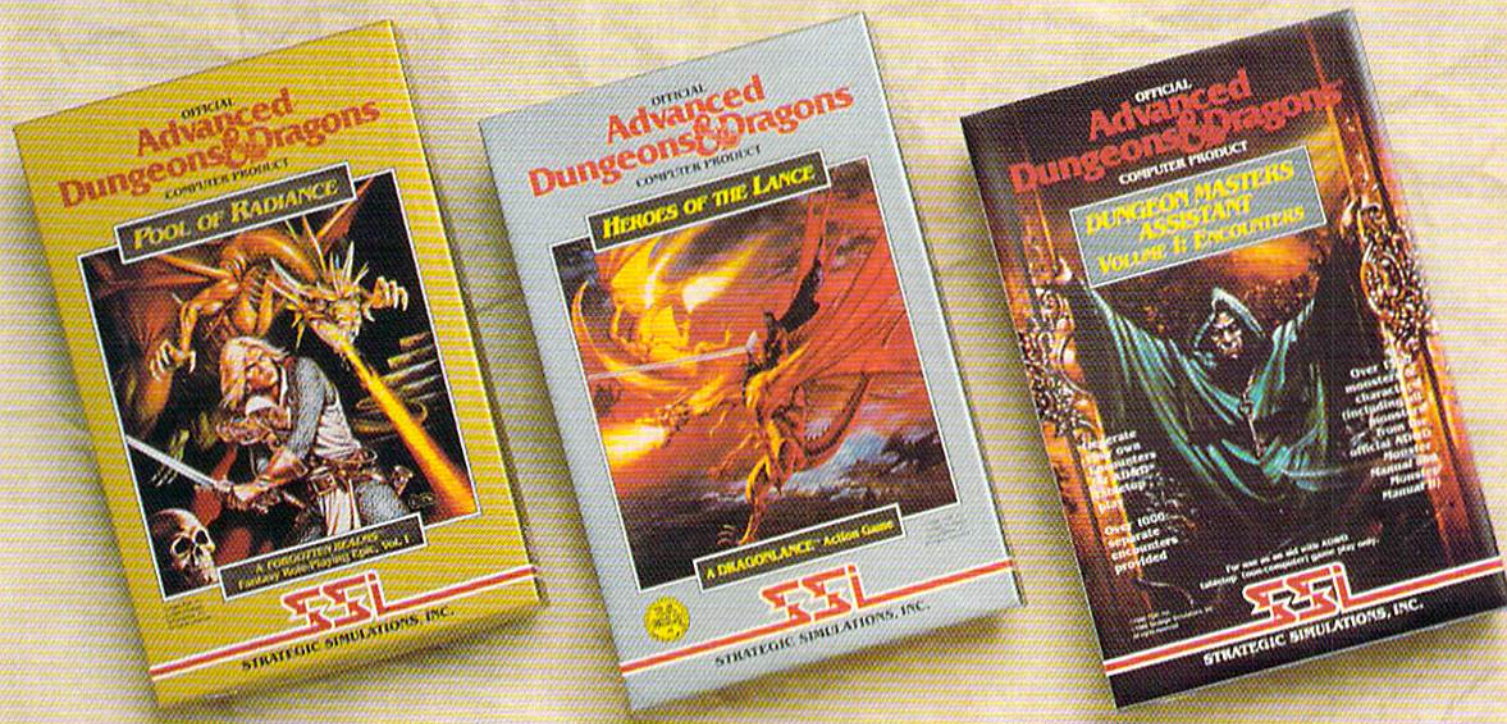
However, copying this pure machine language program to other disks can be a headache for the beginner. Either a file copier or a machine language monitor to copy the program is necessary. That's why I wrote DOS 5.1 Auto-Copy, which automatically saves a copy of DOS 5.1 to disk.

To use it, run the C-64 Wedge program, then type in and run my program. Place a work disk in the drive and press the @ key followed by the ← key, and DOS 5.1 will be saved to disk. Finally, copy the C-64 Wedge Loader Basic program to the same work disk. Repeat this process for each disk that you want to contain a copy of DOS 5.1.

```
Ø REM DOS 5.1 AUTO SAVE - BRET TIMMINS
                                        :REM*72
1Ø FORT=5312Ø TO 53191:READ A:CK=CK+A:POKE
   T,A:NEXT                             :REM*247
2Ø IF CK <> 1ØØ74 THEN PRINT"ERROR IN DATA
   ...":END                             :REM*219
3Ø POKE 52235,2Ø7:POKE 52246,127        :REM*14
4Ø PRINT"ENTER "CHR$(64)CHR$(95)" TO SAVE
   MODIFIED DOS 5.1"                    :REM*185
5Ø DATA 14Ø,199,2Ø7,142,198,2Ø7,173,39,2Ø4
   ,2Ø1,95,24Ø,9,174,198,2Ø7,172        :REM*225
```

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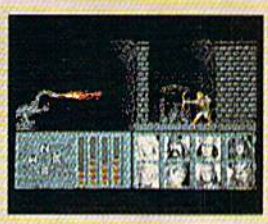
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Action

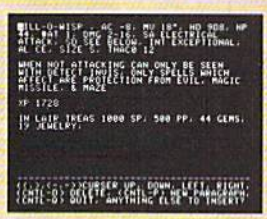
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```
6Ø DATA 199,2Ø7,76,72,2Ø5,169,Ø,141,39,2Ø4
   ,162,8,16Ø,97,32,186,255          :REM*245
7Ø DATA 162,191,16Ø,2Ø7,169,7,32,189,255,1
   69,Ø,133,195,169,2Ø4,133,196      :REM*35
8Ø DATA 169,195,162,255,16Ø,2Ø7,32,216,255
   ,76,144,2Ø5,68,79,83,32,53        :REM*137
9Ø DATA 46,49,Ø,Ø,256                :REM*23Ø
```

—Bret M. Timmins, Sandy, UT

$4CB Modified Blank-It! 64

My program, a modified version of Blank-It! 64 (Mega-Magic, January 1988) uses the F1 key to toggle between a blank screen and the display screen to prevent screen burn. Since the blank screen gives the impression that the monitor is off, I changed the screen color to dark gray to show that the monitor is still on.

When you run the program, it will write a machine language file to disk called BLANK-IT (910). Type in "BLANK-IT (910)",8,1 and then the SYS 910 command to run the program.

If you'd like to change the color of the blank screen, enter POKE 955,X, where X, your screen color, ranges from 0 to 15. To use the F3, F5 or F7 function keys to activate the routine, type in POKE 938,X, where X is 5, 6 or 3, respectively (F1 is 4).

```
Ø REM MODIFIED BLANK-IT 64 - BILL FISHER
                                     :REM*228
1Ø C$=CHR$(34):PRINTCHR$(147) "FILE WRITER
    FOR MODIFIED BLANK-IT."          :REM*147
2Ø PRINT"{CRSR DN}INSERT FORMATTED WORK DI
   SK"                               :REM*95
3Ø PRINT"{CRSR DN}THEN PRESS RETURN"
                                     :REM*31
4Ø GETK$:IFK$<>CHR$(13)THEN4Ø        :REM*229
5Ø PRINTCHR$(17);" WORKING..."        :REM*8
6Ø OPEN5,8,2,"Ø:BLANK-IT (91Ø),P,W"
                                     :REM*144
7Ø PRINT#5,CHR$(142);CHR$(3);        :REM*1Ø4
8Ø FORX=1TO111                       :REM*159
9Ø READ Y:PRINT#5,CHR$(Y);           :REM*179
1ØØ NEXTX                            :REM*151
11Ø CLOSE5                           :REM*121
12Ø PRINTCHR$(147)"{2 CRSR DNs}NOW LOAD "C
    $"BLANK-IT (91Ø)"C$",8,1"        :REM*16
13Ø PRINTCHR$(17);"{2 CRSR DNs}SYS 91Ø TO
    ACTIVATE - SYS 1ØØ6 TO STOP"     :REM*172
14Ø DATA 12Ø,173,2Ø,3,172,21,3,141,236,3,1
    4Ø,237,3,169,167,16Ø,3,141,2Ø    :REM*174
15Ø DATA 3,14Ø,21,3,88,96,165,197,2Ø1,4,2Ø
    8,42,173,17,2Ø8,41,16,24Ø,38     :REM*2Ø4
16Ø DATA 173,32,2Ø8,141,235,3,169,11,141,3
    2,2Ø8,173,17,2Ø8,41,239,141,17:REM*23Ø
17Ø DATA 2Ø8,169,255,133,251,169,255,133,2
    52,198,252,2Ø8,252,198,251,2Ø8:REM*244
18Ø DATA 244,1Ø8,236,3,173,235,3,141,32,2Ø
    8,173,17,2Ø8,9,16,141,17,2Ø8     :REM*37
19Ø DATA 76,199,3,243,49,234,12Ø,173,236,3
    ,172,237,3,141,2Ø,3,14Ø,21,3     :REM*74
2ØØ DATA 88,96                       :REM*113
```

—Bill Fisher, Armonk, NY

$4CC Reverse Kn-Kn-Kn-Knocker!

If your 1541 or 1571 disk drive hasn't been behaving well lately, it may be out of alignment. You could take it to a repair shop, but before you shell out $40 or $50, try "knocking" some sense into it with my Reverse Knocker program.

This 64- and 128-mode program reverse-knocks the drive head 100 times, which may re-align the drive just enough to postpone an expensive realignment. Be forewarned: have an old work disk in the drive when you run it, and don't worry if running this program makes your disk drive sound like a smoldering Buddy Rich drum solo. It *is* a noisy program, but if you type it in correctly, it won't hurt the drive or disk at all.

```
Ø REM REVERSE KNOCK YOUR DRIVE - STEPHEN C
  HEUNG                              :REM*225
1Ø OPEN15,8,15,"I"                    :REM*27
2Ø SP=1:FORI=1 TO 1ØØ:GOSUB4Ø:NEXT :REM*35
3Ø FORI=1 TO 2Ø:SP=-1:GOSUB4Ø:NEXT:PRINT"A
   LL DONE!":PRINT#15,"I":CLOSE15:END
                                     :REM*131
4Ø PRINT#15,"M-R"CHR$(Ø)CHR$(28):GET#15,A$
   :A=ASC(A$+CHR$(Ø)):BI=A AND 3    :REM*9Ø
5Ø BI=BI+SP:BI=BI AND 3               :REM*7
6Ø R=(A AND 252) OR BI:PRINT#15,"M-W"CHR$(
   Ø)CHR$(28)CHR$(1)CHR$(R):RETURN:REM*219
```

—Stephen Cheung, Deer Park, NY

$4CD Envelope Addresser

When was the last time you wrote a letter with your word processor, then mailed it in an envelope with a hand-written address? Envelope Addresser, a short C-128 and C-64 program, prints both yours and the receiver's address on business and standard envelopes.

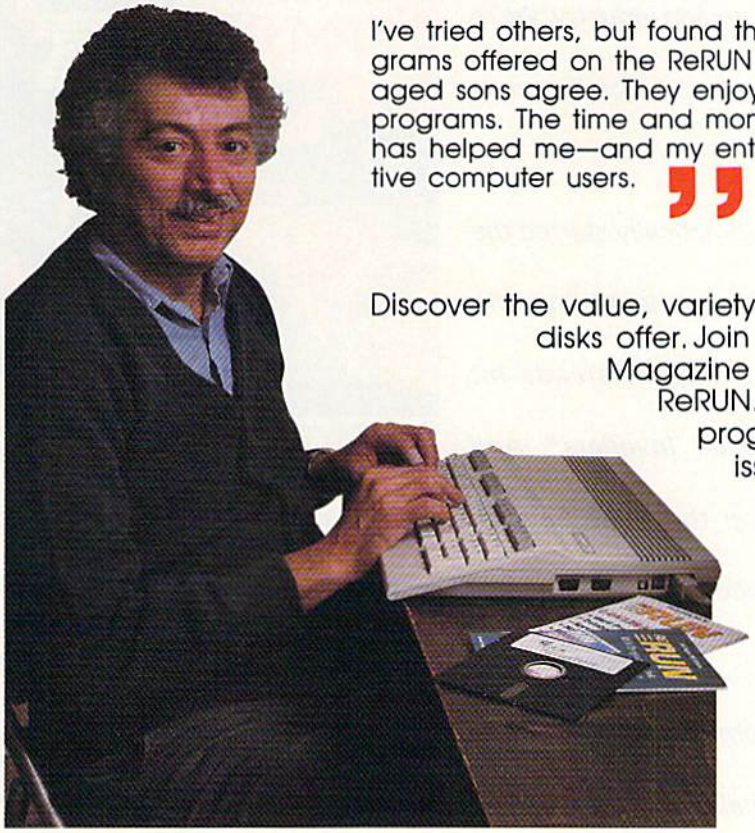
Place your address in lines 50 through 80. If the return address is only three lines, delete line 80. When you run the program, you'll be prompted for the envelope size and for up to four lines of the addressee's address.

```
Ø REM ENVELOPE ADDRESSER - JOHN E. MILLER
                                      :REM*73
1Ø DIMA$(4),B$(4):K=45:PRINTCHR$(147)
                                     :REM*191
2Ø PRINT"STANDARD OR BUSINESS ENVELOPE? (S
   /B)"                              :REM*12Ø
3Ø GET T$:IF T$<>"S" ANDT$ <>"B"THEN3Ø
                                     :REM*242
4Ø IF T$="S"THEN K=3Ø                 :REM*66
5Ø A$(1)="YOUR NAME"                 :REM*118
6Ø A$(2)="YOUR STREET ADDRESS"       :REM*117
7Ø A$(3)="YOUR CITY & STATE"         :REM*1Ø5
8Ø A$(4)= "YOUR ZIP CODE"             :REM*86
9Ø PRINT:PRINTTAB(1Ø)"RECEIVER'S ADDRESS":
   PRINT                             :REM*74
1ØØ FORJ=1 TO 4:PRINT"LINE #"J;:POKE 198,1
    :POKE631,34:INPUTB$(J):NEXT      :REM*44
11Ø OPEN4,4:FORI=1TO4:PRINT#4,SPC(2)A$(I):
    NEXT:CLOSE4                      :REM*191
12Ø OPEN4,4:PRINT#4,SPC(24Ø):FORI=1 TO J-1
```

Continued on p. 89.

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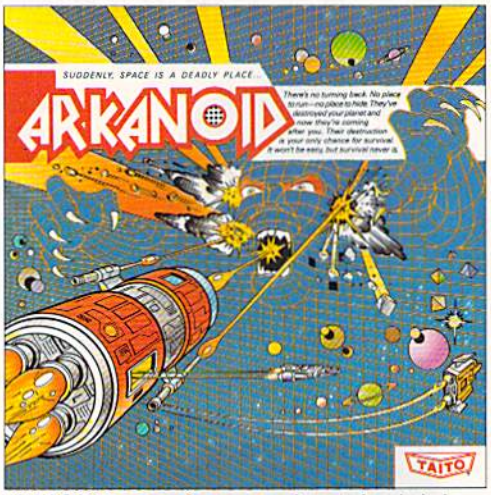
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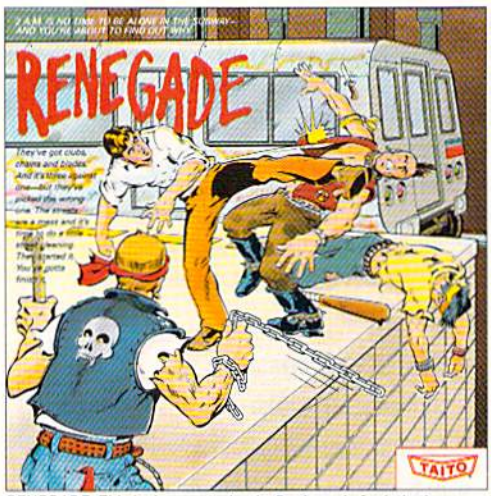
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Electronics Chip

MIAMI—A new microchip, called the ZR2, provides 12 different routines to be used in the electronics industry. Routines include ac and dc dimmers (allowing dims from fast to slow times), serial data manipulation (allows you to make your own simple modem and store data to tape), 16-channel decoder, a counter, four chase and zoning routines (which chase at different rates) and an 8-by-8 matrix. The ZR2 comes in a 40-pin chip, requires only +5 volts and needs one 4-MHz crystal and is 100 percent software compatible. It's available for the C-64 for $35 from ALX Digital, 12265 S. Dixie Highway, Suite 922, Miami, FL 33156.

Check Reader Service number 400.

Solar Star

LAKE HOPATCONG, NJ—Solar Star, an arcade game for the C-64, puts you in command of the most advanced recovery craft ever designed. Your mission is to collect valuable crystals from 16 different solar grids, which are protected by a computer with deadly force. There are four separate display screens to give you a front-grid view, two scanners and a status screen. It's available for $9.95 from Microdaft, 19 Harbor Drive, Lake Hopatcong, NJ 07849.

Check Reader Service number 410.

$$$$$ Win $10,000 $$$$$

MIAMI—Mystery and intrigue, plus cash prizes, await the computer sleuths who solve the crimes on the luxury liner SS Bourgogne as she sails across the ocean in Murder on the Atlantic. From Intracorp (14160 SW 139th Court, Miami, FL 33186), this murder mystery is being launched with a prize giveaway valued at $500,000.

Set in 1938, you must explore the ship's 600 salons and staterooms, seeking clues, decoding locks and messages, watching for booby-trapped rooms, locating the 40 suspects and taking their statements. The program comes with over 60 clues and 16 questions to answer for entry in the prize giveaway: What is the significance of the button and the paper clip? Who was the woman who lost so much at the casino? Who kidnapped Wilhelm Reimann?



It takes logic, determination and skill to solve the mysteries in Intracorp's Murder on the Atlantic.

Every package of Murder on the Atlantic, available for the C-64 for $34.95, includes an entry form for the contest, which runs through December 31, 1988. The software sleuth who submits the most correct answers will win the grand prize of $10,000. An additional 2500 winners will each receive a software gift certificate from the company.

Check Reader Service number 409.

Three From SSI

MOUNTAIN VIEW, CA—Strategic Simulations (1046 N. Rengstorff Ave., Mountain View, CA 94043) has released three new games for the C-64.

First up is Questron II, a fantasy game, in which the only way to destroy the Evil Book of Magic is to prevent it from ever being created. And with these words from Mesron, the Great Wizard, you realize the adventure you thought had ended in Questron has only just begun. You're hurled back to the distant past, to a time before the Evil Book of Magic had been created by the six mad Sorcerors. You must find them and prevent the consummation of their abominable deed. $39.95.

Next is Sons of Liberty, a Revolutionary War simulation. The game contains three battles (Bunker Hill, Monmouth and Saratoga), each increasing in complexity and scale. In solitary play, the computer can direct either or both sides. $34.95.

Finally, Panzer Strike!, a World War II simulation, covers three theatres: the Eastern Front, the Western Front (only those campaigns that do not involve American troops) and the North African campaign. You can simulate single battles or an entire campaign. And, you can create your own maps, troops and missions. $44.95.

Check Reader Service number 402.

The Sound of Commodore Music

SANTA MARIA, CA—The SFX Sound Expander, a menu-driven music generator, creates its own sounds, using the Yamaha FM synthesizer technology to produce nine different notes at one time, and each sound may be selected individually from a software library of 24 distinct instrument tones. These voices can be channeled to your monitor or hi-fi. Software options include normal or single-finger chord playing, octave transposes, ensemble on/off, chord memory and programmable split point. It's available for the C-64 for $180.

An FM Composer and Sound Editor, available for $45, complements the SFX Sound Expander to allow you to enter, edit and play back any piece of music that can be written in standard music notation. You can also modify note tempo, loudness, transpose, performance voice, key and detune, among ►

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2400's are great (but quite expensive). Most users can't justify the cost difference unless they do a large amount of modem work with a service that can handle 2400 baud.

You will also notice a few very cheap 1200s on the market at "too good to be true prices." They are. The reason is that they are usually foreign built and not truly Hayes® and Commodore 1670® compatible therefore not usable in all situations and with all serivces.

What is Hayes® compatibility? It's the industry standard and about all modem manufacturers have adopted the "AT" (Hayes) command set. Virtually all software being written now uses Hayes commands. Beware of those who don't.

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DTR Signal Support?	Yes	No	Yes
High Speed Detect Line?	Yes	No	No
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Number of Status Registers	16	3	?
Guarantee	1 yr.	90 days	?

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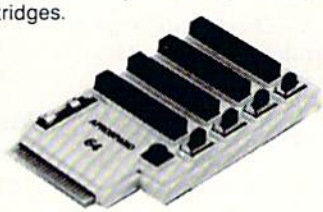
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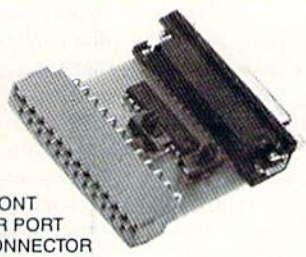
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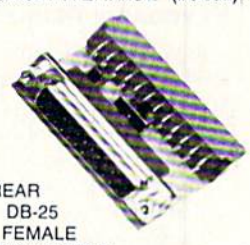
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Check Reader Service number 403.

THIS

PLACENTIA, CA—The Technological Highbred Integrated System (THIS), version 2.0, is a C-128 drawing system that can produce a simple doodle or a sophisticated blueprint. A resolution of 960-by-536 dots per drawing page increases the detail that can be added. THIS prints a complete drawing to scale within $^1/_{64}$ of an inch, and printouts can range in size from 2-by-2 to 480-by-321 inches.

In addition, the program provides real-time object rotation and move; real-time cut, copy, paste and zoom; a graphics library containing over 100 detailed electronics symbols; and over 700 type sizes and ten font styles. Applications include mechanical blueprints, architectural drawings, flow charts, pattern designs in carpentry, clothing, stained glass, artwork and graphs.

The program comes with a 1351 mouse and DT-170 light-pen drivers. The light pen is available separately for $99. THIS is available from Micro Aided Designs (PO Box 1982, Placentia, CA 92670) for $63.99.

Check Reader Service number 404.

KEYBOARD PECKER

ROME, GA—Typing Teacher, for the C-64 from Future Age Computers (3 McCrary Drive SW, Rome, GA 30161), is designed for beginning and expert typists. The 16 lessons on the disk have color-coded keyboard drills that show which finger to use and will even flash the key to help you find it quickly. When you have learned the key locations, a timed practice for each lesson shows you how you're progressing. Lesson 16 reviews all keys and also provides 118 narrative tests that can be used to evaluate your developing typing skills. You can even type in new narrative tests. It's available for $29.95.

Check Reader Service number 405.

USE A COMPUTER? EXPECT A MALFUNCTION SOON!

CENTERPORT, NY—If you own or use a personal computer, you can expect it to malfunction in the next 12 months, according to a recent study conducted by Business Products Consulting Group, an international management consulting firm specializing in market research.

"We were a bit surprised when some of the statistics came through the wash," said the firm's Senior Research Analyst, Jim Tsivitis. "The most startling figure was a failure rate of 69.5 percent among those polled. That figure is considerably higher than most manufacturers would have you believe.

"Furthermore, we found that each system requiring a repair needed an average of 1.47 repairs per year, or nearly three repairs for every two units serviced. That's a lot of failure for such a relatively new capital investment."

TEST YOUR NINJA SKILLS

GREENSBURG, PA—Paragon Software (600 Rugh St., Suite A, Greensburg, PA 15601) has released the C-64 version of Master Ninja: Shadow Warrior of Death, an animated martial arts adventure game. You assume the identity of the warrior sent on a quest to recover a precious magic sword stolen by an evil Japanese warlord. You must guide the ninja through more than 25 chambers of the warlord's castle, battling evil ninja warriors, Samurai guards, mystic ninja priests, black magic curses and deadly tigers. You call upon your martial arts skills and ninja weapons to kill your opponents, recapture the magic sword and assassinate the warlord. It's available for $29.95.

Check Reader Service number 401.

GRUNTS

SAN JOSE, CA—Data East USA (470 Needles Drive, San Jose, CA 95112) has released the C-64 version of Platoon, a strategic military combat simulation based on the movie of the same title. And, as in the movie, there are no winners. Instead, you parallel the movie experience in various steps with the object of trying to have your platoon of five men survive the missions, keep their sanity and morale intact, and return to base safely. The simulation consists of six sections, each presenting an increasingly arduous situation, from leading your platoon safely through the jungle to finding flares and a compass in an underground tunnel network. It's available for $29.95.

Check Reader Service number 411.

GEOS 2.0 IS LOADED!

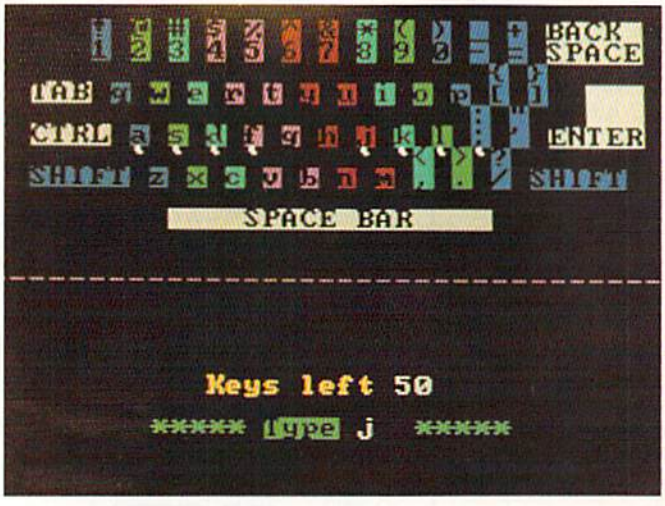
BERKELEY, CA—Berkeley Softworks (2150 Shattuck Ave., Berkeley, CA 94704) has introduced an enhanced version of GEOS that includes geoSpell and geoWrite Workshop, as well as a redesigned operating system and deskTop. GEOS 2.0 also possesses an improved geoPaint, geoMerge, Text Grabber and a self-running demonstration program of the other GEOS applications.

Berkeley Chairman Brian Doughtery feels that the new package lays to rest rumors of lack of attention to the Commodore market. "We wanted to give C-64 owners the same ease of use Macintosh owners enjoyed," he said. According to Dougherty, GEOS 2.0 "is the result of two years of refinement to the GEOS operating system, extensive user research and customer-service feedback."

For $29.95, GEOS users can upgrade to the new version or purchase the GEOS 2.0 package for $59.95.

Berkeley also announced at CES in Chicago a $20 price reduction (to $49.95) for geoPublish.

In addition, Berkeley revealed a new bundling arrangement with Commodore. Commodore disk drive buyers will receive the GEOS operating system Kernal and deskTop V1.5; the GEOS 1.2 package, which includes geoPaint and



Future Age Computers' Typing Teacher lets you practice your typing skills on the standard, Dvorak and C-64 keyboards.

geoWrite, will no longer be bundled with the base unit.

Check Reader Service number 412.

German Agency Rescinds Ban on Silent Service

COLOGNE, WEST GERMANY—Silent Service, MicroProse Software's computer simulation of WWII submarine combat, is again on sale in West Germany after the German Federal Office for Examination of Harmful Publications (BPS) lifted its ban less than 24 hours before a scheduled hearing in the Administrative Court of Cologne on the company's claim that the government agency's procedures in the case have been inadequate under German law.

The ban, imposed in February 1987, prohibited advertising Silent Service in any medium or selling it in any retail establishment that does not have an adults-only entrance.

Fred Schmidt, MicroProse Director of Marketing and Communication, has been coordinating his firm's defense against the agency. He said that as far as he and his German attorneys know, the agency's reversal of its ban is "totally unprecedented." Schmidt also said that MicroProse's next move has not yet been determined. "Once we see how the BPS explains its turnaround, we'll know better how to proceed," he said.

Four Games for Half the Price

LAGRANGE, IL—Free Spirit Software (905 West Hillgrove, Suite 6, LaGrange, IL 60525) has released Moffatt's Adventure Disk #2, a collection of four text adventures on one disk for the C-64.

In Temporal, a hit on the head with a brick plunges you into a surrealistic world, which you must wander through to find your way back to reality.

In West, you arrive as a stranger in an Old West town, where you are deputized by the sheriff and sent out to capture the notorious outlaw, Black Bart.

In Death Valley, you are stranded in the desert without food or water, and, using survival techniques, you must find your way to safety.

In The Lighthouse, a group of spies has set up headquarters on a remote island, and you are sent on a mission to capture them.

Moffitt's Adventure Disk #2 is available for $19.95.

Check Reader Service number 407.

Plug-in Modem

ADDISON, IL—The TCM-1200H-Jr Hayes-compatible cartridge modem for the C-64 and C-128 is housed in a small case and features auto-answer, auto-dial and auto-baud select. It has an internal speaker with volume control and over 60 AT commands are available. The 4¾ × 2¾ × ¾-inch modem plugs into the user port and requires no RS-232 interface or power supply. Both Bell 212A and the CCITT V.22 standard are supported, making it usable all over the world. The package includes software and a two-year warranty. It's available for $89.95 from Trans Com, 703 Annoreno Drive, Suite 13, Addison, IL 60101.

Check Reader Service number 408.■



Circle 40 on Reader Service card.

MAIL RUN

A reader makes new friends, an Okidata user is delighted and some C-128 owners get mad.

Q-Link Correction

Your comparison of Q-Link with GEnie (Telecomputing Workshop, May 1988) was informative, but I'm sure Q-Link will have corrected you before you get my letter. You say ". . .you must buy their software unless you get it free with GEOS or a Commodore modem." On page 17 of the same issue, Q-Link has two offers. You can get their software free with the purchase of one month's service or receive a gift of both the software *and* a 300-baud Commodore 1660 auto-dial modem with the purchase of four months' service.

—Larry D. Borshard
Parsippany, NJ

Darn it! We missed that one. Thanks for pointing it out, Larry.

—Editors

Why So Little C-128 Support?

In reference to the April RUNning Ruminations about the winter CES in Las Vegas, Technical Editor Tim Walsh asked, "Why so little C-128 support?" I've also asked this question. One thing I suggest we 128 owners do is write to the software companies and let them know how we feel. If our protest is large enough, maybe they'll seriously consider releasing 128-specific entertainment software.

I'm glad to see that Infocom is supporting the 128 with programs like Beyond Zork 128. It reminds me of when I first bought my 64 and Zork I. It seemed like there was nothing for my 64, then—boom!—the rest is history. But for now, all I can suggest is to write to the software developers and howl for C-128 support. I know I will.

—Brent Long
Berne, IN

My 40/80 Key Stays Down!

I'm sure I speak for many C-128 owners who are angry and dismayed by the failure of software companies to publish serious software for our chosen machine. Perhaps their reasoning is: "There are eight or ten times as many C-64s as there are C-128s; all C-64 software will run on the C-128; therefore, write for the C-64 and all can run it." They fail to consider that they are asking us to disable a very significant part of our very superior machine to run their product. We don't like that!

We 128-ers have several options: band together and assert our strength in numbers, rely on European software, make more use of the CP/M mode or give up and use some other brand of computer.

As for me, I do not own and will not buy any C-64 software. Moreover, the 40/80 display key on my 128 stays in the "down" position!

—Jesse E. Sherwood
Martin, TN

Come Down from Your Mountain, Commodore!

I'm a happy C-128 owner, but Commodore seems a little mortified about their own product. They hardly ever advertise it, and programs for it are hard to find.

Commodore appears to be completely ignoring the C-128, and C-64 owners can breathe easily only because of their numbers. If history is any guide, I'd advise Amiga users to be vigilant: Their machines are only one generation of computer away from being put out to pasture. Remember the SX-64, the Plus/4, the C-16?

It's my belief that Commodore will have to come down from its mountaintop and open up to its customers if it wants to enjoy ongoing relationships.

—Norman Morrison
Oxford, AL

What a Delight!

When my husband and I upgraded to the Okidata 180, we were delighted with its speed, modes and pitches, but not happy with the graphics generated in Commodore mode. We decided to set the 180's dip switches to Epsom emulation and connect the 180 to our G-Wiz interface. A call to Okidata confirmed my idea that it would not be harmful to the printer. And, wow! What excellent eight-pin graphics!

Then we purchased a Xetec Super Graphix interface to replace our old G-Wiz. We simply couldn't be happier with the graphics and haven't hesitated to discuss it with other people. In fact, another member of our user's group has also purchased the Okidata 180 along with the Xetec Super Graphix interface, and she seems equally delighted.

—Helen Slabaugh
Seattle, WA

Commodore Camaraderie

Ever since you published my letter in the October 1987 Mail RUN, I have had many letters from fellow Commodore users in the U.S. and a few phone calls from readers in the U.K. I now regularly write to some of them about Commodore computers and other matters. I've helped one of your Virginian readers trace his ancestral home in this country. Lucky enough, it was only 20-odd miles from here and very well known. There seems to be a camaraderie amongst C-64/128 users that knows no barriers of country or class. I have made more friends through my computers than I did in many years of being the president of a local club.

—David Peacock
Fleetwood, Lancs.
England

Mail Response

I read Frederick O. Smith's letter (Mail RUN, February 1988) about the military being charged double for postage, and I believe I can throw some light on the matter.

I work in the shipping department of Surfside Components International, in Capitola, California. We ship orders UPS unless the address is an APO or FPO number, to which UPS will not de-

liver. In such cases, I must make a special trip to the post office to mail the order.

Also, special packaging and care are needed when shipping to military addresses. Since a box of delicate equipment might drop 50 feet from a helicopter onto an aircraft carrier, it needs to be repackaged in a bigger box with more packing to absorb the impact. All this costs more money.

—David English
Capitola, CA

Cardco Interface Wanted

I use C-128s to run my brain research experiments here at Northwestern University. I've been using the old Cardco type A (parallel) interfaces to dump my ultra hi-res (640 × 200) graphics presentations of brain waves to my Epson MX-80 printers. Unfortunately, my lab was recently burglarized, and the crooks took the interfaces. Does anyone know of a source of these old interfaces, since Cardco has gone out of business?

J. P. Rosenfeld, PhD
Dept. of Psychology
102 Swift Hall
Northwestern University
Evanston, IL 60208

Supra Corp. (1133 Commercial Way, Albany, OR 97321; phone 503-967-9075) has acquired the Cardco inventory, and should be able to provide the interface you need.

—Editors

Mission Accomplished

I'm writing to you because I got the Congressional Medal of Honor on MicroProse's Project: Stealth Fighter. I had a heck of a time getting it because I had to hit ten additional targets plus shoot down five airplanes all in the same mission. My total score was 2500 and had a stealth percentage of 29.

—Todd Wydra
Albuquerque, NM

We'd also like to add Malcolm Harris of Fort Bragg, North Carolina, to the list of players who've earned the Congressional Medal of Honor. Congratulations to you both.

—Editors

Mice or Mouses?

What is the plural of mouse? My mother says mice. I say mouses. I don't think the rules of grammar apply here, since the word has a different meaning. Who's right?

—Robert T. Klace
Miami, FL

Listen to your mother, Bobby. Actually, the plural of mouse is mouse input devices (according to our editor-in-chief), or mice (according to our technical people and Webster's Ninth New Collegiate Dictionary, *1984 edition), or mouses (according to this editor). And* Barron's Dictionary of Computer Terms *and other published sources carefully avoid using the plural altogether. We guess it's just personal preference. Readers, what do you think?*

—Editors

ReRUNning Ruminations

Your commentary in RUNning Ruminations (April 1988) touched a responsive chord in my heart and my pocketbook. At age 84, I've been privileged to watch the early airship and plane flights and then use this mode for almost a million miles of business travel. I drove noisy one-lungers over dusty roads and saw the automobile transformed from a luxury into a universal method of transportation.

Several years ago, convinced that the computer age was arriving, I purchased a C-64, since it appeared to be the Model T of its generation. But I was somewhat appalled by its complexity and the paucity of instructional material. Some Commodore books did help me to understand some of the fundamentals, but I decided that the computer industry had not provided the universal problem solver for the American family.

The general-purpose computer, now described as a personal machine, will enter into the life of most families only when, as happened with air travel and automobiles, it is generally affordable, easy to use and provided with adequate service.

—Charles W. Seager
Brevard, NC

To Save-with-Replace or Not To Save-with-Replace?

When that bug bites/In your disk drive,/And your files/Start to spread;/Just a routine in the ROM chip;/A design flaw,/Or so I've read./If your syntax/Is kinda shaky,/And you don't use/SAVE at zero;/Just a schizoid/ROM routine, babe,/'Cos it's snatched/From a 4040. (Sung to the tune of "Mack The Knife".)

Seriously, though, I'm going to eliminate the confusion over the SAVE@ bug and Eric R. Pickell's error once and for all.

SAVE"@FILENAME",8 (the syntax used by Eric) will create a file named "@FILENAME", just the same as SAVE"#:FILENAME",8 will create a file named "#FILENAME". Nothing on the disk gets replaced.

SAVE"@:FILENAME",8 replaces a file. However, it also stirs up the hornets' nest and leaves you open to the Bug Bite.

SAVE"@0:FILENAME",8 is the bug-proof syntax that safely replaces a file with the new version. Even Commodore has attested to this method.

—Dean R. Kazmierczak
North Tonawanda, NY

"Once and for all"? Well, maybe. Thanks for the little ditty you wrote (with apologies to Kurt Weill, et al).

—Editors

A Call to Readers

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

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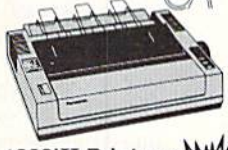
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SOFTWARE GALLERY

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Compiled by BETH S. JALA

THE THREE STOOGES ..... A

Nyuk, Nyuk!
Hey, Wise Guy!

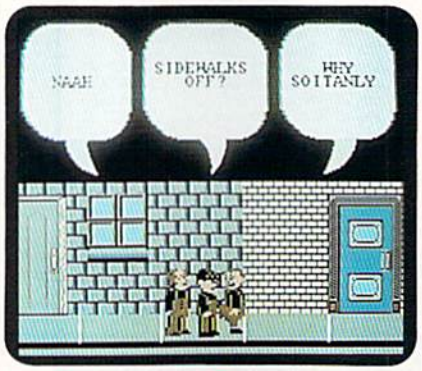
They've suffered through periods of greatly decreased popularity. Critics have said that they have no artistic merit. Moral leaders have claimed that they corrupt our youth.

All of these comments apply not only to The Three Stooges comedy team, but also to computer games. Thus, it is fitting that these two cultural phenomena should come together in The Three Stooges game for the C-64.

The software's plot centers around an orphanage. An evil banker plans to foreclose its mortgage unless Moe, Larry and Curly earn $5000 in 30 days. An additional $2500 will repair the building, and, if the boys are even more successful, they'll get to marry the beautiful daughters of the orphanage's owner.

A day's activities for our heroes begin at a map of Stoogeville. Moe's fingers move rapidly over representations of six items and locations, which vary with each round of play. Pressing the joystick button stops the hand to select one of the images, one of which is a mousetrap, which catches Moe's fingers. Landing on these images five times automatically ends the game. However, another map symbol offers a way of avoiding these hazards. If the hand picks a slapping contest square, the game faithfully reproduces the trio's most famous routine. As Moe stands between his two partners, he tries to punch, slap, poke and kick them as often as possible. If he succeeds, his fingers move more slowly on future map screens, allowing the player to more easily select a desirable image. If he misses or if Curly or Larry hit him, Moe's hand moves more quickly.

Different map symbols lead to other "shticks," which have been converted into money-producing arcade sequences. For example, the game has copied Curly's memorable encounter with a soup bowl's attack oyster. There's also a chance to see "Pop Goes the Weasel" make a prizefighting Curly go berserk; and, of course, there's ample opportunity to engage in pie fights.



Hey Moe, Larry and Curly: what are you doing on my Commodore?

Other map pictures result in less frantic activities, such as trivia tests. Solutions to these quizzes can be found in an illustrated booklet, which serves both as an instruction manual and as a history of and tribute to the three buffoons.

The software's graphics live up to Cinemaware's stellar reputation, as does its animation. The sound is also superb, with lively background themes and speech-synthesized exclamations providing much of the game's zany atmosphere.

Fortunately, the loading of these sensory effects does not delay the action. However, the frequent switching of the game's two disks can become a minor annoyance.

The Three Stooges is not for all C-64 owners, and some will pass it up for more sophisticated entertainment. But for the millions who laugh whenever they hear "nyuk, nyuk" or "soitenly," Cinemaware's well-crafted program should be an irresistible product. *(Cinemaware, 4165 Thousand Oaks Blvd., Westlake Village, CA 91362. C-64/ $34.95.)*

—WALT LATOCHA
OAK PARK, IL

PAPERCLIP PUBLISHER .... A

Another Star for C-64 Desktop Publishing

I continue to marvel at the productivity software coming on the market for the humble C-64. PaperClip Publisher is easy to learn, yet versatile enough to accomplish professional results. The program includes a text and graphics editor, as well as utilities to import graphics and text files from a number of other programs.

The What-You-See-Is-What-You-Get ►

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.

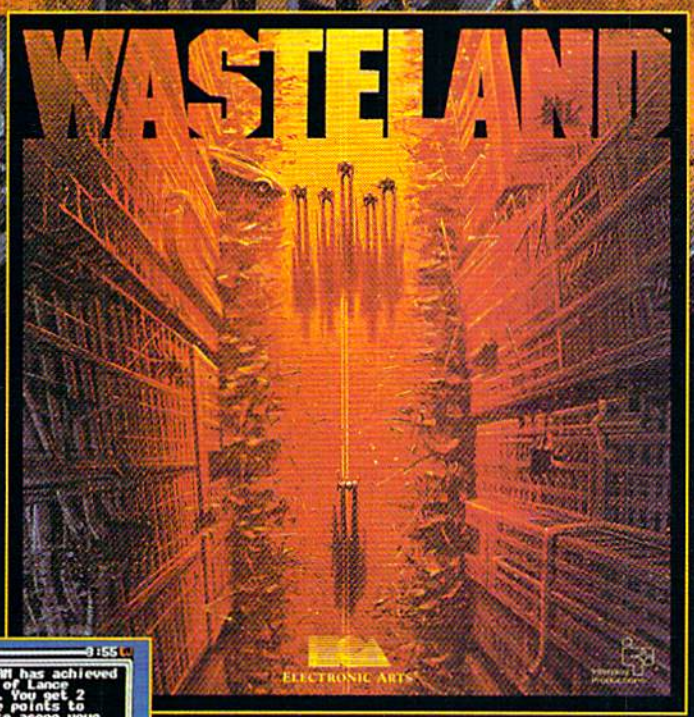
C Average.
Lives up to its billing. No major hassles, headaches or disappointments here.

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

E Failure.
Many problems; should be deep-sixed!

"It wins my vote for *Adventure Game of the Year.*"
-William "Biff" Kritzen, *Computer Gaming World*

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AUGUST 20, 2087

Nothing could be worse than this god-forsaken, radioactive desert.

More Sniperdroids! All tracking me with them death glares. And them Uzis. They're weird trigger-twitchin' folks. I suspect it's them poisoning the water.

Or maybe it's those Leather Thugs. Heck, I don't know anymore. I heard they have a bunch of civilians cut off east of Ranger Center, which is where I'm headed. Hope not. They want me dead. Like every other mutant this side of Vegas.

The worst part is, I'm getting to be as bad as they are. You wouldn't believe some of the ways I've learned to kill. I hang out in sewers, and my best friend is a MAC 17 submachine gun.

Gramps talked about life before the nuclear war. All I know is I don't want others living this way. Gotta rebuild this desert right. Gotta make it so you can sleep with your eyes closed.



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(WYSIWYG) screen display allows for easy page layout in sizes from 3×3 inches to 8½×14 inches. Instead of the multiple keyboard commands used by most word processors, PaperClip Publisher uses pull-down menus, tool icons and windows called Requester Boxes. Once horizontal and vertical margins are indicated, elements like headlines, subheads, copy and graphics are set in boxes. The boxes aren't printed, but act as page layout guides.

With this box system, text can be linked on a page or over a series of pages, thereby continuing articles from the first page. For further flexibility, any box and its contents can be temporarily moved to the area around the page called the Artboard. The boxes can then be rearranged on the current page or moved to another.

To get you started, PaperClip Publisher comes with some sample layouts, clip art files and five fonts in several sizes. There's a font converter that'll import fonts from Outrageous Pages or GEOS. The only limitation is that the converter must recognize fonts of 24 points or less. Any font can be set in light, bold, italic, back-slant, outlined, underlined, shadowed, reversed, mirrored, upside-down, superscript or subscript. This is an impressive list of style options in addition to the great variety of fonts that can be used by the program.

The File Converter utility imports word processing files from PaperClip I, II or III, Bank Street Writer, Word Writer I or II and PaperBack Writer. The Text Editor allows for editing and formatting the imported files, or it can be used to create new text. Text can be set flush left, flush right, centered or fully justified.

With the File Converter, you can also directly import graphics from The Print Shop, PrintMaster, Outrageous Pages, Newsroom and Doodle!. PaperClip Publisher has a great graphics editor that helps you design new art or alter existing clip art. The best feature of the editor is the ability to enlarge or reduce all or part of a drawing. The editor utilizes a Magnify mode for individual pixel editing.

The limits of 50 pages and 60 boxes should cover most situations. Each box contains only one font in one size, but boxes can be positioned so that there's a smooth transition between elements in a column. For example, I used a column-wide box for a heading, one directly beneath it for a sub-heading, and another for the body copy. Printed without the box outlines, the column doesn't reveal its building-block beginnings.

Boxes can be superimposed or overlapped to provide many different effects. A box containing text can be created on top of a box containing a graphic border. When printed out, the elements are combined.

I was going to give the program a minus for the painfully long printing time and small list of supported printers. However, considering all that you get in a 64K program, it is worth the wait. When I couldn't find my printer on the list of 12 or so supported, a call to customer support solved the problem. I was told which driver to use and how to set the interface.

PaperClip Publisher is a handy and inexpensive way to get started in desktop publishing and to get professional results with your dot matrix printer. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$49.95.)*

—SUSAN LAMB
YUMA, AZ

THE PRESIDENT IS MISSING ..... A

Your Mission, Should You Decide To Accept it....

It's refreshing to find a program that appeals to a broad spectrum of would-be gamers. The President is Missing is an enigma as far as computer games go because it transcends several game genres. It's not an adventure game, and it can't be labeled a simulation, at least in comparison to currently available simulations. If there's such an animal as a simulation of a simulation, then this intriguing software package would fit. The President is Missing could perhaps appropriately be called an "interactive graphics adventure simulation."



Is this international figure one of your suspects in The President is Missing?

As the title suggests, the unthinkable has happened: the president, along with ten other heads-of-state, has been kidnapped while attending a summit in a small European country. The planning, timing and flawless execution of the abduction suggest that the kidnappers involved are highly trained, well funded and members of an international group of professional terrorists. It's your job, as a specially appointed investigator, to identify the terrorists and collaborators and somehow find the people they kidnapped.

To aid you in this seemingly impossible task, the Central Intelligence Agency has made available the main computer of its counter-terrorist branch. To gain any margin of success with this game, the CIA's computer must become an extension of your thoughts. By combing through its massive data banks, you must reconstruct the events leading up to the abductions, analyze and investigate the data surrounding the kidnapping, and follow up clues on possible suspects and motives.

Within the computer, you'll find intelligence files on all aspects of the abduction scene, dossiers on important government officials and information pertaining to several seedy individuals usually associated with terrorist actions. Also available are satellite photos, official government documents and records and confidential reports.

One interesting item included with the program is an audio tape that includes actual newscasts of the terrorist action, official reports, interviews, and, most importantly, a transcript of the terrorist's demands. Though many of the recordings on the tape appear to offer no direct lead to the kidnappers, almost all of them can aid you in several aspects of the investigation.

Rounding out the resources at your command is the ability to send agents on various missions. Through judicious use of these CIA operatives, you can investigate people, places or things anywhere in the world. When particular missions have been completed, reports from the agents eventually filter back to you. Justice Department agents can also be used to detain and question suspects, or capture and secure premises. The results of such operations, as well as communications from the CIA, FBI and State Department, turn your computer into an information clearing house. ►

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Circle 98 on Reader Service card.

The user interface between player and computer is friendly, quick and logically laid out. The digitized, high-resolution graphics are nicely done, adding a macabre sense of realism to what could be a chilling event in world politics. Above all, The President is Missing exudes the self-confidence of a professionally crafted game, meticulously plotted out from inception to production.

This is definitely not, however, a program for the casual gamer, or for children less than high school age. The program requires patience, forethought and deductive reasoning. The investigation could conceivably takes weeks to complete, and those could be weeks filled with identifying, analyzing, investigating and following up on leads that result in dead ends. But there are little victories to be gained along the way—just enough to shore up an investigator's resolve after chasing a hundred false leads.

With terrorist actions around the world headlining the news these days, The President Is Missing successfully brings the world of covert intelligence operations to the safety of your own home. The audio tape supplied with the game is so realistic that it easily buttresses the frightening realization that the fiction of today may very well be the fact of tomorrow. *(Cosmi, 431 N. Figueroa St., Wilmington, CA 90744. C-64/$24.95.)*

—JOHN RYAN
BILOXI, MS

SKATE OR DIE ..... B+

Step into a World Where Rock 'n Rolls are Rad And Aerials are Awesome!

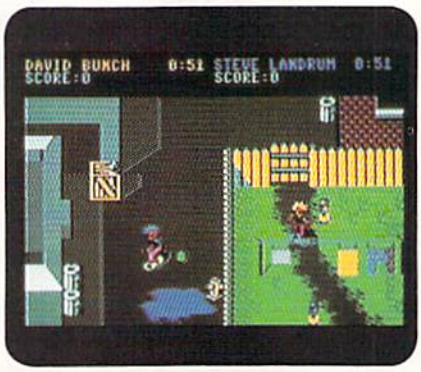
Hey, dude, I just got my hooks on this rad new game. From the outrageous package to the disk inside, this thing is wild, man.

We're talkin' hot stuff here. It's like some of those other games for your Commodore—ya know, the ones that let you play all different sports—only this one is the neatest, 'cause it's about skateboarding.

It's got these five different events that you can use to practice till you're hot. Or, you can compete against the computer or up to eight buddies. Watch out for those computerized dudes. Poseur Pete is nothin'—you can use him, man. Aggro Eddie is not as sketchy, but with a little practice on your board, you can take him. Don't go messin' with that bionic dude Lester until you've really got your act together.

You'll have to visit Rodney's skate shop first, but that's okay because he's cool. He's Lester's dad, which gives you some idea why Lester is so bad. Rodney'll let you pick whatever color board you're into, and let you see the most outrageous scores anybody ever got in competition. Best to skate out soon, 'cause Rodney will give you some lip if you hang around too long.

You can skate right into town square. Don't worry about gettin' lost, 'cause



Stay on your board and watch out for Lester in Skate or Die's Downhill Jam.

there are signs that tell you how to get to each event. Cruise on down the right street, then sit back for a breeze while the computer does its thing. You'll see different things dependin' on the direction you go.

In Downhill Jam, you better be tough, 'cause we're talkin' inner city blues. You'll be in some back alley where you can bust some bottles, break some flower pots or knock over a few garbage cans. But watch out for Lester, 'cause he's gonna be tryin' to trash you. Defend yourself by throwin' kicks or punches while you and Lester slide down the alley. Stayin' on the board ain't so tough, 'less Lester kicks your butt or you go slammin' into some fence. You get bonus points for everything you trash, including Lester.

Downhill Race is my favorite, man. Just you and your board in this neat oceanside park. Cruise down the hill jumpin' obstacles, tuckin' in tight through waterpipes and slidin' around some wicked curves. The more you clear and the faster your time, the better your score.

No need explaining what a Freestyle Ramp is, right? You know how to boogie in one of those babies, don't you? You can do six different moves—everything from Kickturns to Ollie Airs—just by pressing your fire-button and movin' the stick in the right direction at the right time. You can even do 180s or 360s in mid-air! It takes split-second timing, but the more moves you do in ten passes, the more points you get. Just be cool, man, or you'll find yourself splattered all over the concrete.

The High Ramp's no tricks—just guts. Build up speed by thrashin' your joystick back and forth as fast as you can. You get up to five passes, but you might not need them all to get some good air. Hit your fire-button when you've got the most air, and you'll get points for how high you get. Yeah, it's kind of a drag, but it does take good timing.

The Pool Joust is like the Freestyle Ramp, but in an empty pool—and with someone tryin' to take your head off. You get five passes to try to slam the other guy off his board with a boffing stick. When you're not boffing, work on your Ollies and Rail Slides for extra points. First dude to get three slams on the other guy wins. This one takes guts and a lotta really heavy duty concentration as well.

No matter which event you pick, there's nothin' sketchy about the graphics or the animation. We're talkin' primo stuff here. Everything works so sweet it feels like, y'know, you're really out there on the board thrashin'. And just like a real board, even the slightest tweek of your stick makes it twitch.

And man, the detail is outta sight. Like if a dude falls out of the ramp, you can see his pads and stuff splatter when he hits the pavement. Or if he runs into a chain link fence, his body parts kinda squeeze through the links, like cheese through a grater.

Hey, that may sound like a bummer, but it ain't bad 'cause it's happenin' on the monitor and not out in the real world. Fact is, you can try some real rad moves that you wouldn't think of doin' on your real board. Or if you live someplace where it snows or rains a lot, it ain't such a drag 'cause you can do your thing right on the computer. No muss, no fuss, no broken bones, man. It's cool, and there's nothin' else like it. If you don't buy my line, man, just ask Rodney. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

Editor's Note: Our author went a little overboard (pardon the pun) with his language in the foregoing review. But, like hey, if you play the game, you just might feel like bailing out and tuning in to this sport, too!

THE LURKING HORROR .... A *Do Not Attempt To Adjust Your Monitor*

The Great Dome of G.U.E. Tech loomed above me, nothing more than an eerie shadow against the midnight sky. It was difficult to make out the details of the structure, especially with the blizzard threatening to toss me off the ladder leading up to the dome. As I tenaciously moved from rung to rung, I knew I could freeze to death rationalizing why I shouldn't explore the edifice. But as I entered the warmth of the dome, I realized that I had made a terrible mistake. No sooner had I stumbled into the center of the dome when a growl pierced the night. There was something crawling up the ladder! Pulling out my knife, I whirled to face the hideous thing that came flapping out of the night. I did not like my chances...

No, this is not an excerpt from a horror novel—just one of my own experiences while playing The Lurking Horror. The atmosphere generated by this superb adventure forces the player to reflect upon his or her innermost fears—those dark and intangible images from childhood: the shadow in the half-closed closet, or the skeleton we thought was clicking silently beneath the bed. The chances are that most of us have varying thresholds of terror. Whatever it is that alarms, unnerves, dismays, startles, or turns blood into ice water can be experienced in this boundless romp into the unknown.

Welcome to G.U.E. Tech. As a young freshman at this Ivy League haven for future mechanical and aerospace engineers, chemists and computer scientists, you have braved a raging blizzard to get to the campus computer center. Finishing an overdue term paper was foremost on your mind, but this night will find you drawn into a web of murder, mayhem and monsters.

Several students have recently vanished. Moreover, eerie tales of dank corridors beneath the ancient halls of G.U.E. only enhance your inexplicable urge to explore them. And what to make of this strange, rune-encrusted stone suddenly in your possession? How can the computer nerd, Hacker, help you? What about that very strange professor? And is that beast in the basement a university mascot or a demon?

While these are only a smattering of the hundreds of questions that will undoubtedly pop up, be prepared to spend several long nights attempting to find the answers. Lurking Horror appears easy at first, as several clues seem to fall into your lap, but don't let this fool you.

Lurking Horror is interactive fiction, so you affect how the story will end, and must choose your own path to get there. It's like living a book, where you enact the drama instead of reading it.

The story's parser is limited to a vocabulary of about 600 words, which is rather small as modern adventures go. But I found this of little consequence, and only rarely ran across entries that the program couldn't understand.

Having booted up dozens of adventure games over the years, it's refreshing to find one that compels me to return to the keyboard. Lurking Horror is certainly not the most sophisticated or intricate adventure you'll run across, but it's well worth the time and money. Lurking Horror is good, scary fun for the whole family. *(Infocom, Inc., 125 Cam-* ►



bridgepark Drive, Cambridge, MA 02140. C-64/$34.95.)

—JOHN RYAN
BILOXI, MS

STRIKE FLEET ..... B

Modern Naval Warfare
Set in Today's Hot Spots

One of the first things you might notice about Strike Fleet is the game's overall graphic similarity to last year's PHM Pegasus, also from Electronic Arts. While Pegasus put you at the helm of a single patrol vessel, however, Strike Fleet lets you command an entire task force of up to 16 ships. The movement of your fleet can be controlled from the bridge of your flagship, or you can go to the bridge of any ship in your fleet and command that one individually.

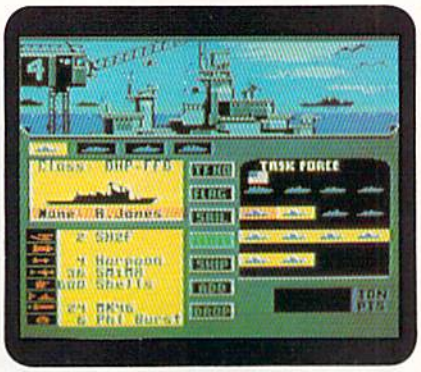
Instead of rehashing famous naval battles from WWII, Strike Fleet introduces ten new plots, all based on modern situations and current world affairs. For example, in one scenario, The Road to Kuwait, you're required to escort three reflagged Kuwaiti tankers out of the Persian Gulf through the Strait of Hormuz. Another Gulf mission puts you at the helm of the USS Stark during what may or may not be a routine patrol.

Other hot spots where you might see some action are the North Atlantic, the Falkland Islands and the Norwegian Sea. Each of the ten scenarios can be played individually, or the four most difficult can be played sequentially in a campaign game. Some games could take several hours to complete; fortunately, games in progress can be saved to disk.

Because Strike Fleet simulates modern naval warfare, the forces you'll command and the enemies you'll face are all equipped with state-of-the-art warships and missile systems. Among the surface vessels you'll command are the Kidd Class destroyer, the Belknap Class cruiser and even the Pegasus hydrofoil missilecraft. Most ships are also equipped with one or two helicopters that can be launched and operated independently. A standardized control panel and ordinance board make it a breeze to operate the entire fleet singlehandedly.

The enemies' forces are even more diverse than your own. They include a variety of Russian, Iranian, Argentinian and French-made warships, submarines and aircraft. In addition, both sides come complete with a huge arsenal of the latest anti-ship and surface-to-air missiles and torpedoes.

Although Strike Fleet can be played entirely with a joystick by simply highlighting control panel options and clicking, there are also keyboard equivalents of all propulsion, navigation and weapons commands. These keyboard commands are diagrammed on a separate card and, once learned, allow you to quickly and smoothly operate any of the ships or helicopters in your task



Just one of the ships you can control in Strike Fleet's task force.

force. If you liked PHM Pegasus or are simply a fan of military simulations, particularly the naval variety, Strike Fleet will give you all the action you can handle. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

BLACK JACK ACADEMY .. B+

An Education
At the Table

As its name implies, Black Jack Academy not only turns your C-64 into an expert blackjack dealer, but also provides an education on the finer points of this popular casino game. In this case, the classroom is a blackjack table where you and up to four other players can learn all about card counting, splitting pairs, doubling down, breaking the bank and losing your shirt.

At the Setup menu, you begin a game by entering each player's name and the dollar amount of the chips they'll have to start with. Other adjustable parameters include the number of decks you'll play with, the minimum and maximum bets, and the rules that will be in effect during your game. Choices of rules include Las Vegas Strip, Downtown Las Vegas, Reno and Atlantic City Rules.

From the Setup menu, you proceed directly to the table to place your first bets and begin play. As the invisible dealer goes into action, you hear the familiar sound of playing cards being shuffled followed by the light slap of each card as it hits the table. All cards, including the colorful face cards, are realistically drawn, both front and back, and the green blackjack table scrolls smoothly from left to right to accommodate all five players.

Blackjack is a relatively simple game and even amateur programmers can do a decent job of simulating it on a computer like the C-64. However, it's clear that the designers of Black Jack Academy have gone to great lengths to ensure that this game outshines anything you're likely to find in the public domain.

Besides the nice graphics and sound effects, Black Jack Academy features convenient pull-down menus, and it can be played almost entirely with a joystick or by using the equivalent keyboard commands. The Play menu, for instance, lets you hit, stand, place a bet, split a pair, double down or surrender the current hand. Other menus let you adjust the overall speed of the game, toggle the sound, save the current game to disk or restore a previously saved game.

A Strategy menu can be accessed during a game to check the optimal play for the current situation, to review basic guidelines for playing and betting, to see which rules are being used or to check the current card count. An Optimal Play Quick Reference Card shows in chart form exactly when to hit, stand, double down, split or surrender based on all possible hard and soft totals and the dealer's up card. Possible exceptions and variations to use when playing under different casinos' rules are also included.

In addition, brief tutorials on specific aspects of the game can be loaded from the program disk via a special help menu. There are ten help files in all, ranging from a simple synopsis of the basic rules to more extensive discussions of rule variations, card counting and money management. Each help file is clearly written and succinctly summarizes what you need to know to be a successful blackjack player against your C-64 or in the casinos.

Of course, it's a lot easier to wager with huge piles of digital dough in your own home than it is to gamble with your hard-earned money in the casinos.

Wherever you play, though, it's a sure bet that Black Jack Academy can increase your understanding, skill and enjoyment of the game. *(MicroIllusions, distributed by Mediagenic (formerly Activision), 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$39.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

DARK CASTLE ..... C–

A Pretty Sound And Look to a Disk-Intensive Game

I like to review a game or two occasionally, not only for personal relaxation, but also to monitor progress in the Commodore marketplace. So, I viewed the arrival of Dark Castle as an opportunity to take a look at what's new in the world of C-64 gaming.

Unfortunately, I'm disappointed. Sure, the program has great graphics and fine sound effects, but spend five minutes playing it, and you'll realize that these features are misleading. Dark Castle is nothing more than an exercise in joystick flogging.

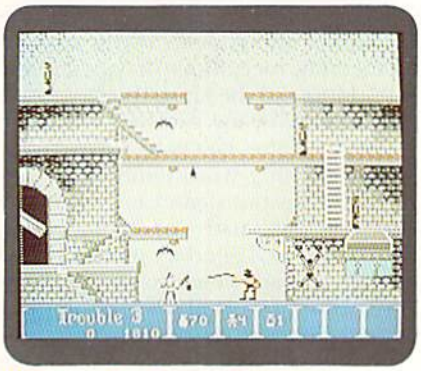
You'll find a sophomoric story line on the Dark Castle instruction card. If that isn't sufficient, you can load more instructions from the disk. You are the hero whose primary purpose in life is to throw rocks at bats and rats. You must also find time to guide your character through dungeons, across hanging ropes, over moving rocks and other obstacles.

I shouldn't be excessively critical, because Dark Castle does have its merits. Scores of adolescents are certain to revel at the way Dark Castle makes good use of the joystick skills and quick reactions they've fine-tuned through countless afternoons spent at the mall pumping quarters into the arcade machines. Old timers like myself who celebrated their final teen years a dozen or more years ago are almost certain to find the program far too action-intensive to progress beyond the lowest levels.

There's a darker side to Dark Castle, which is heavily copy-protected. To begin with, high scores are saved to the master disk. Adding to this potential danger, the program accesses the disk so many times that it must be flipped from side to side during game play.

Also, I think the program should have lasted longer than four hours. That's how long it worked on my original ROM-equipped 1571 before it decided it didn't want to load anymore. I was able to load it exactly five times on my C-128D's built-in 1571 before it decided to give up on that disk drive. Judicious use of the program keeps it in working order on my C-64/1541 combination, but the appearance of random characters during loading seems to indicate it's becoming temperamental with that equipment, too.

Dark Castle may be worth the money if you like fancy graphics and sound. Just hope the program doesn't get mad at the disk drive before the day is over. *(Three-Sixty, Inc., 2105 S. Bascom Ave., Campbell, CA 95008. C-64/$34.95.)*



Watch out for bats and rats as you travel through Dark Castle's dungeons.

—TIM WALSH
RUN STAFF

WINTER CHALLENGE ..... C+

It's Easy To Handle Winter, When It's Only on Your Computer!

When the Winter Olympic Games were held in Calgary in February, millions of people watched via television. Now Thunder Mountain is hoping to attract some of those people to their computer monitors to participate in a few of the events that made the Winter Olympics such a big hit.

Winter Challenge simulates five different sporting events: slalom and downhill skiing, ski jumping, biathlon and bobsledding. If you don't like the cold, or if the old neighborhood bobsled run has closed for the season, you might enjoy passing the time with this program.

It certainly wouldn't be a waste of your time, because Winter Challenge has some features that make it worth trying. It also has some flaws, but its low price makes them somewhat more tolerable.

My biggest complaint about Winter Challenge is the time it takes to load. Whether you're booting it up from scratch, or just waiting for the transition from one event to the next, it takes way too long. It's about as much fun as standing on a lift line at a popular ski area on a weekend afternoon.

If you have enough patience to tolerate the long load times—at least two to three minutes between events—you'll be rewarded by Winter Challenge's fine graphics. Backgrounds are particularly appealing and are often better than those found in more expensive programs.

Game play is simplistic, but nevertheless challenging. The animation in the ski jump event is a little choppy when the skier is heading down the ramp. Keeping the skis straight requires a quick, deft touch and is crucial to making a smooth landing.

The graphics in the downhill aren't quite as good as in the ski jump, and animation is again choppy. For example, trees seem to hop past, instead of smoothly rushing by. The feel is pretty realistic, though, right down to the skier leaning into the turns. The goggle perspective is a nice idea, but hard to take advantage of because the view is so small.

The graphics in the biathlon are among the best in Winter Challenge and the competition is the toughest. It's very difficult developing the right rhythm to make your skier move at top speed. It also takes great timing and quick reflexes to nail all five targets with the five allotted bullets.

The graphics in the slalom are pretty good, but the animation and feel are not. The skier looks much too cartoon-like as he dodges gates, and the slightest twitch of the joystick makes him careen across the width of the trail. The challenge is mildly entertaining, but just not realistic enough.

The graphics and animation in the bobsled competition are pretty good, but the event is boring. It takes much too long to complete a run, and the challenge disappears after a few twists and turns. Trying to shave split seconds off your time by following the perfect line through the course just isn't incentive enough to make more than a couple of runs.

Fortunately, there are enough challenges in the other events to make the program on the whole really a very decent way to pass some time. Especially if you'd rather be indoors during the cold months, Winter Challenge, with its low ►

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—SCOTT WASSER
WILKES-BARRE, PA

BETTERWORKING WORD PUBLISHER ..... D

More Features For GEOS

Mother always said, "If you can't say something nice, don't say anything at all." Little did she know that her words would ring in my ears as I write this review of the GEOS-based package, BetterWorking Word Publisher.

GEOS has two significant advantages over the C-64's native operating system. The icon-based interface places the user in intuitive and comfortable control of the computer, and the bit-mapped screen makes it easy to display a combination of text and graphics. The major advantage of GEOS-based word processors is their ability to print documents containing a variety of type styles and sizes. Word Publisher, for example, is capable of up to nine fonts and six type styles per page.

When you're entering and editing text with this program, it abandons the integrated What-You-See-Is-What-You-Get (WYSIWYG) screen in favor of a word-wrapped, 40-column display. Formatting commands are embedded in the text. Boldface, italics, underlining and font changes are all represented by reversed ampersand (&) characters sprinkled throughout your document. Avoiding the on-screen display of these attributes is intended to eliminate delays when you want the C-64 to scroll a bit-mapped graphics display. The result is a package that is neither a credit to GEOS nor a very good example of what a word processor can be.

Word Publisher doesn't let you see what your document will actually look like until you move from the editing screen into one of two Display modes. Two clicks of the mouse let you scroll through a WYSIWYG view of your work a page at a time or preview a representation of the page layout on the right half of your screen.

For some very powerful C-64 word processors that haven't implemented a software solution to the limitations of a 40-column screen, this is a long-accepted alternative to WYSIWYG. However, Word Publisher's other features are not strong enough to justify segregating its editing and viewing functions.

GEOS-based word processors generally recognize that their strengths lie in the ability to integrate graphics and don't try to compete with the non-GEOS powerhouses. While Word Publisher's goals are commendable, the implementation of its other features, particularly a 100,000-word spelling checker and a mail-merge option, leave something to be desired.

The spelling checker function is slow. It took almost five minutes to check a single-page document. There is no way to add words to the dictionary, and no suggestions on the correct spelling of words the program doesn't recognize.

Mail merge is another Word Publisher feature that you normally only get with a full-function word processor. The idea is to let your software churn out form letters by reading names, addresses, and so on from a separate file. Unfortunately, the instructions for actually implementing a mail merge are so cryptic that even an experienced user will have trouble understanding how this feature works.

The program has some additional minor annoyances. For example, the cursor cannot be easily positioned at the very end of a document. You must either push the black square symbol for a carriage return ahead of the text as you type, or switch off Insert mode and type over it.

Editing with the mouse is awkward, because you can only scroll up or down a screen at a time. To move the remaining lines of a paragraph into view requires that you abandon the mouse in favor of the cursor keys.

Mail merge is not the only function that is short-changed in the accompanying, spiral-bound instruction booklet. Integrating geoPaint graphics, one of Word Publisher's most important abilities, merits but a single puzzling paragraph.

In fact, the entire manual is poor. Its 31 pages include three pages of restrictions, a four-page glossary and six pages of instructions on how to start the program. The remaining 15 pages contain far less information than you need to make this program work

By now, you may think that all I'm going to do is tear this software to bits, but in fact I did discover two nice things about Word Publisher. It comes in an attractive package and it's not copy-protected. *(Spinnaker Software, One Kendall Square, Cambridge, MA 02139. C-64/ $39.95.)*

—JOHN PREMACK
CAMBRIDGE, MA ■

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—geoTerm is the first terminal program for GEOS. Before the **GEOS Power Pak**, this application had the experts stumped. But now you can telecommunicate to BBSs and online networks, sending and receiving messages, attending conferences and uploading and downloading programs.

—CardFile is a file manager that comes in handy to maintain lists. Use it as an address book or to keep lists of tapes, records or household items . . . the possibilities are endless.

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—Pick from over one hundred illustrations to use in your own documents.

ACCESSORIES

—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.

—geoBreak. Enjoy this classic arcade game.

—Convert 2.2. Convert GEOS data and programs for uploading and downloading with geoTerm.

—Write Hand Man. Word and document analyzer.

—AutoView. geoPaint slide show maker.

—PaintView II. View geoPaint pages.

Like the original GEOS program, the **GEOS Power Pak** greatly enhances the capabilities of your C-64.

Let's face it. You've invested lots of time and energy learning to use GEOS. The **GEOS Power Pak** returns this investment tenfold with easy applications, expanded capabilities and increased productivity.

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- Compatible: With Fast DOS and Turbo Rom Systems
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This is unique to Action Replay!!

● Warp Save/Load Available straight from Basic.

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* In our most recent test we were unable to find any program that AR4 could not dope with.

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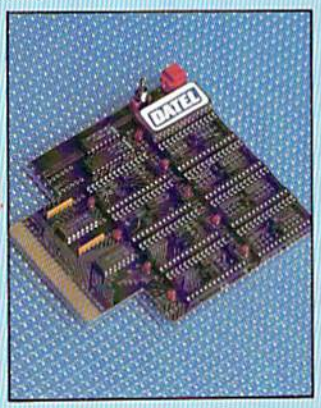
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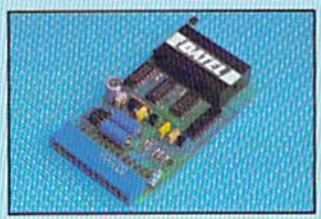
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- Simply plugs internally into A500 slot. ● Switch in/out with switch supplied. ● Fitted in minutes – no soldering etc.
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SO...YOU WANT TO BE A Power User?

If you've been on the Commodore scene for a while, maybe it's time to see how far you can expand your computer.

IF YOU THINK YOU'VE OUTGROWN the capability of your C-64, think again. With some "hardpower," you can have your little eight-bitter doing virtually anything the big boys can. Here's a look at some hardware add-ons that will help you get more from your computer.

Memory Storage

A computer can never have too much memory. More memory means more space for programs, which translates directly into more features and additional functions. Extra memory also provides more space for data your programs can work with—larger word processor documents or more spreadsheet numbers, for example. With database programs, you can speed up search and sort operations by bringing larger chunks of the database file into the extra storage space.

Large blocks of memory can also be partitioned to store additional programs or applications. One way of doing this is to organize the memory to work just like an additional disk drive. The advantages of such a RAM disk are fast access to the files and compatibility with existing software.

Several products are available that expand the memory capacity of the C-64. Perhaps the largest single memory add-on is Commodore's 1764 RAM Expansion Module. It adds 256K of storage capacity to the computer—four times the internal RAM—and comes with a replacement power supply, plus software including RAMDOS, Commodore's RAM-based disk emulator that lets you use the 1764 as a high-speed drive. RAMDOS also works with commercial programs that are written to support it.

Most older programs that take control of the computer won't benefit from the 1764, although they will run with the module in place. However, some new programs, as well as updates of existing ones, have been designed to utilize the storage capacity of the expander, the most notable example being GEOS and its applications software.

You have two options when using the 1764 with GEOS. The first configures the RAM expander as a shadow drive that stores a copy of whatever is written to or read from your disk drive. The second configures the 1764 as a RAM disk, which behaves just like a second disk drive. You copy your application or document onto the RAM disk, then carry on as if it were a second drive. One limitation here is that you can't set up the RAM disk as a third drive if you already have two drives. The RAM disk will replace one of the existing drives.

While we're talking about GEOS, see if you can catch yourself a 1351 mouse. In Proportional mode, this hairless, long-tailed rodent makes GEOS a real pleasure to use, while in Joystick mode, it functions with older programs. Graphics packages designed for joystick or trackball operation work surprisingly well with the mouse, and the combination of 1764 RAM expander and 1351 mouse really makes GEOS take off!

Like regular RAM, the contents of a RAM expander disappear as soon as the computer is turned off. There are two ways to add memory that doesn't forget. One is to provide a battery backup for the RAM, as in the Quick Brown Box. Using a built-in lithium battery, this unit can retain data for up to ten years—surely an ade- ►

BY MORTON KEVELSON



ILLUSTRATED BY JOHN PIRMAN

quate interval, since I know of no C-64s that have been in service for anywhere near that long.

The Quick Brown Box is a game-style expansion cartridge with a capacity of 16, 32 or 64 kilobytes. It comes with a number of utilities—stored inside its own RAM—that manage the contents of the Box in connection with the 64 or the 128. The primary application for this accessory is keeping a variety of unprotected programs ready to be rapidly loaded when needed. It's particularly handy if you like to write your own programs, since you can quickly and frequently copy them into the protected battery-backed RAM. However, because it has its own operating mode, the Quick Brown Box is of limited use with commercial software.



Adding four times as much external memory to your Commodore is the 1764 RAM Expander.

Once your data is placed into ROM, it becomes virtually permanent.



The Final Cartridge's hardware and software give you more speed, as well as windows and a calculator.

The second form of nonvolatile memory storage is read-only memory (ROM). Once your data is placed into ROM, it becomes virtually permanent, as it can be changed only with difficulty. Thanks to the Jason-Ranheim Company, it's possible for nearly anyone to create personalized program cartridges. Their system is hardware intensive and requires handling sensitive memory chips, but, if you can hack it, it'll place your favorite applications into instant-loading cartridges.

The Jason-Ranheim kit includes Capture II, a memory-grabbing cartridge; Promenade, a device that lets you program your own erasable, programmable, read-only memory (EPROM) chips; and enough hardware to create a single cartridge. (An EPROM is just like a ROM, except it's programmable with relatively simple hardware and can be reused if the data is erased by exposure to ultraviolet light.) Additional blank CPR3 cartridge kits are also available, as well as a package that includes the above plus a second cartridge kit and a DR EPROM eraser. To use the J-R kit, plug Capture II into the expansion port and Promenade into the user port, load and run your program from disk as usual, then just push the button on Capture and follow the instructions in the screen prompts.

If you do your own programming, you may wish to investigate the other cartridges available from Jason-Ranheim. The battery-operated CCSZ Clock/Calendar cartridge will automatically set the time and date in your C-64, and it also contains 8K of battery-backed RAM and space for up to 128K of programs and data in EPROM. The PTM-4 Bank-Switching Cartridge can manage up to 256K of programs and data in up to four EPROMs.

Disk Storage

The disk drive is the true mass storage device for microcomputers, and, as we all know, Commodore's 1541, the workhorse for the C-64, is abysmally slow. However, both Dolphin DOS and RapiDOS Professional can eliminate the 1541 doldrums by giving your drive a high-speed parallel path to the 64. Once one of these computer and disk drive modification kits has been installed, even the longest C-64 programs load in less than five seconds. But be aware that installation requires opening your computer and disk drive and replacing several components, with soldering possibly involved. Taking it to a professional is probably wise. Also, the complete assembly will have an additional ribbon cable tying the computer to the disk drive.

To make the project a bit simpler at only a slight sacrifice in performance, you could install JiffyDOS or RapiDOS, which require replacement of only the Kernal ROMs in the computer and the disk drive. Once again, however, soldering may be needed. Versions of JiffyDOS are available for the C-64 and SX-64 computers and the 1541, 1571, 1581, FSD and MSD disk drives. If you're using a 1571 or 1581 with your C-64, the C-64 Burst ROM will access the high transfer speeds these disk drives can attain. For C-128

PHOTOGRAPHED BY LARRY DUNN

users, the C-128 Burst ROM does the same in C-64 mode. Here again, you must open the computer and replace one of the chips.

If you'd rather not open your computer or disk drive, you might consider one of the many cartridge-based speed-up devices on the market. My personal favorite is Super Snapshot, which saves a running program to disk, plus offering many other built-in utilities, including a file copier, a machine language monitor and screen dumps to disk or printer. Another such product, The Final Cartridge, provides disk speed-up, memory save and a built-in calculator. The primary disadvantage of the cartridge-based utilities is that they tie up the cartridge port so you can't use other accessories, such as the 1764 RAM expander.

Another disk storage option available to C-64 users is the 1581 drive, which provides space for up to 800K of data on a 3½-inch disk. Unfortunately, most commercial software still supports only 5¼-inch disks.

The last, but hardly least, alternative is a hard drive, the best example of which is the Lt. Kernal. It holds many megabytes of data and markedly decreases file-transfer time by creating a high-speed, parallel data-transfer path to the C-64.

Making a disk backup is a tedious task that's neglected all too often. If your operations call for frequent duplication, then the MSD SD-2 is well worth considering. This workhorse of a dual disk drive can back up a 1541-format disk in under two minutes, and if you upgrade it with a Fast Copy ROM, less than 20 seconds are needed. The most significant disadvantage of the MSD is its incompatibility with most copy-protected software.

Printer Enhancements

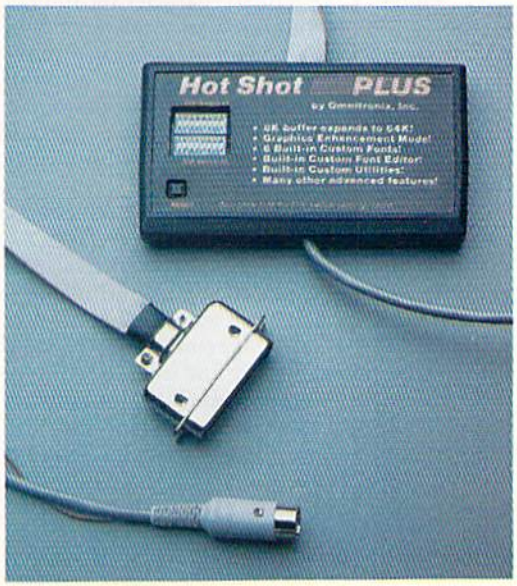
Driving a printer can tie up a C-64 for a considerable time—unless you have an interface with a RAM buffer. The latest generation of such interfaces, including the Super Graphix Gold (32K buffer), the Hot Shot Plus (8–64K) and Device One (16K), also provide built-in fonts, downloadable user fonts and numerous other features. My personal favorite is the Super Graphix Gold, because of its reasonable-sized buffer, wide selection of built-in and downloadable fonts, and ability to communicate at burst speeds with my C-128.

If you already have a full-featured printer interface, you can give it a boost with the Serial Box, a stand-alone 64K serial port buffer. This device accepts data, via the C-64's serial port, at the fastest possible rate, without speed-up enhancements, and its 64K buffer can store the largest C-64 documents, freeing your computer for other tasks more than four times sooner than the fastest printers.

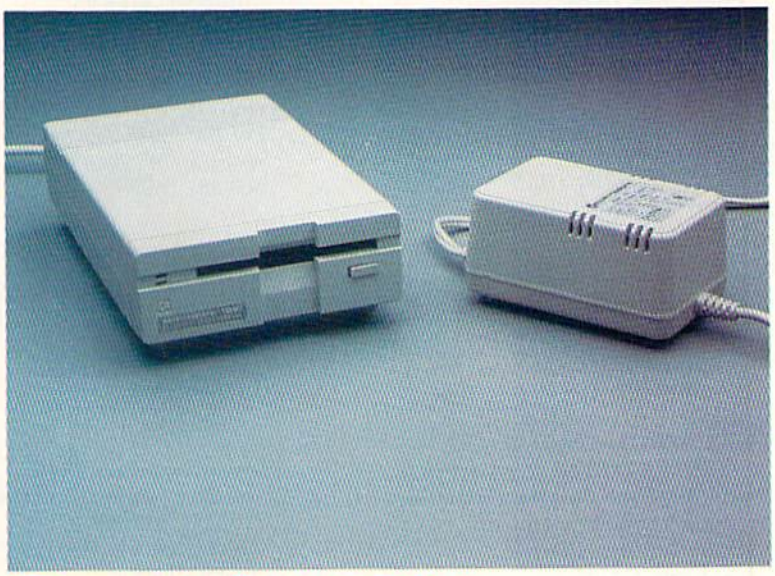
Perhaps the speediest way to get data to the printer is via the user port, and a simple parallel cable connected to a standard Centronics buffer can work wonders. With one of these cables, even Easy Script can send text at more than 1000 characters per second to a suitable Centronics buffer.

Useful Widgets

Now let's turn our attention to some miscellaneous hardware add-ons. Turbo 64 places an entire microcomputer, complete with a 65C816 4-MHz, 16-bit microprocessor, 64K of RAM and 32K of ROM, on an expansion port card. The result is plenty of raw speed. A 6510 microprocessor—the brains of the C-64—can perform one million operations per second. This may sound like a lot, but they're very simple operations and it takes a very large number of them to do anything useful. In contrast, the microprocessor on the Turbo 64 can perform four million opera- ►



Providing you with a printer buffer, fonts and utility programs is Omnitronix's Hot Shot Plus.



With Commodore's 3½-inch disk drive, the 1581, you get 800K of storage.

When selecting power hardware, it pays to plan ahead.

tions per second, enabling most software to run three to four times faster.

Hardware add-ons for giving the C-64 an 80-column screen display used to be available, but are no longer being made. In their absence, a programming approach to increased display capacity employs a redefined character set and bit-mapping. This method is used most notably in GEOS, which can place on the screen proportionally spaced characters in a variety of point sizes. Unfortunately, because of fewer pixels per character, readability suffers somewhat. The best known example of a software 80-column display is the one in Pocket Writer.

Last, but far from least, the X-10 Powerhouse may be the most potent hardware accessory for the C-64. This stand-alone unit, which is programmed via the C-64's user port and includes a real-time clock, acts as an automatic controller for the BSR X-10 series of remote control modules for the home. Each of the plug-in modules controls an appliance or light with a power requirement from 500 to 1500 watts, and the Powerhouse can handle up to 256 modules, so it has a virtual control capacity of 3.84 megawatts—power far beyond the needs (and the utility bill) of most homes!

The Whole System

When selecting power hardware to enhance your computer, it pays to plan as far in advance as possible, to ensure compatibility among the various components you'll integrate into a whole. Also, as you make buying decisions, you'll probably notice that the prices of the various peripherals add up quickly, very possibly exceeding the original cost of your computer. With this in mind, you might consider a direct upgrade to the C-128. It might save you money, while providing you with the convenience of software and hardware compatibility, doubled memory, speed and display capacity, and "natural" disk drive speed enhancements. ■

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

Table 1. Manufacturers and prices.

1764 RAM Expansion Module, $149
1351 Mouse, $49.95
1581 Disk Drive, $249.95
Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Quick Brown Box
16K, $69; 32K, $99; 64K, $129
Brown Boxes, Inc.
26 Concord Rd.
Bedford, MA 01730
617-275-0090

Capture II, $39.95
Promenade, $99.50
CPR3 Cartridge Kit, $29.95
DR EPROM Eraser, $34.95
CCSZ Clock/Calendar Cartridge, $49.95
PTM-4 Bank Switching Cartridge, $19.75
Jason-Ranheim Company
1805 Industrial Drive
Auburn, CA 95603
800-421-7731; 800-421-7748 in California

Dolphin DOS
Micro Accessories of S.A.
Unit 8
Hewittson Rd.
Elizabeth West
South Australia 5113
08-287-0191, 08-252-0881

RapiDOS Professional, $99.95
RapiDOS, $49.95
Turbo 64, $189.95
C-64 Burst ROM, $32.95
C-128 Burst ROM, $38.95
Mass Duplicator, $25.95
Chip Level Designs
PO Box 603
Astoria, OR 97103
503-861-1622

JiffyDOS
C-64, $49.95; C-128, $59.95
Creative Micro Designs, Inc.
PO Box 789
Wilbraham, MA 01095
413-589-7624

Super Snapshot, $54.95
Software Support International
2700 NE Anderson Rd.
Vancouver, WA 98661
206-695-9648

Final Cartridge, $69.95
Distributed by
(among others):
H&P Computers
154 Valley St.
S. Orange, NJ 07079
201-763-3946

Lt. Kernal,
C-64, $899.95; C-128, $949.95
Super Graphix, $99.95
Super Graphix Gold, $119.95
Xetec, Inc.
2804 Arnold Rd.
Salina, KS 67401
913-827-0685

Hot Shot Plus, $99.95
Omnitronix, Inc.
760 Harrison St.
Seattle, WA 98109
206-624-4985

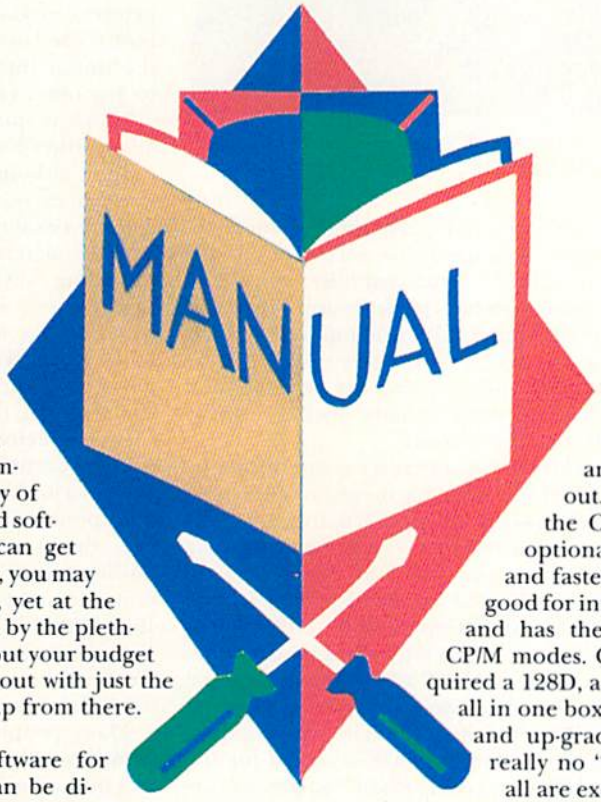
Device One, $119.95
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Denver, CO 80204
303-825-4144

Serial Box, $74.95
R. J. Brachman Associates, Inc.
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Havertown, PA 19083
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X-10 Powerhouse, $49.99
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NEWCOMER'S Guide

If you're new to Commodore computing, here are some guidelines to help you choose the right hardware, software and accessories.



ONE OF THE wonderful things about the Commodore computer is the wide array of hardware add-ons and software packages you can get for it. As a new owner, you may be a bit intimidated, yet at the same time fascinated, by the plethora of great gadgets, but your budget insists that you start out with just the essentials and work up from there. So, where to begin?

Hardware and software for your Commodore can be divided into three general areas: the must-have, the ought-to-have and the special add-ons. Your individual tastes and needs will differentiate the necessary from the purely frivolous.

Hardware Minimums

Computer and disk drive. The core of your system is the computer itself, along with a disk drive. Perhaps you have a C-64, the foundation of Commodore's 8-bit computer line and a great way to start out. Or maybe you chose the C-128, which, with its optional 80-Column mode and faster disk drive access, is good for information processing and has the optional C-64 and CP/M modes. Or, you may have acquired a 128D, a C-128 and disk drive all in one box, with the latest chips and up-grades built in. There's really no "wrong" choice here; all are excellent machines and are well supported by the third-party software industry.

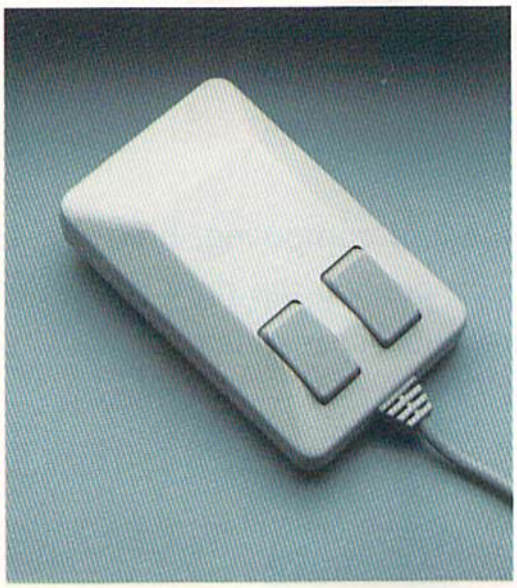
The disk drive, considered optional when there was a wide selection of software for the Commodore 1530 Datassette, is now really essential, with most manufacturers issuing their programs on disk only. Drives for your Commodore may be either single-sided or double-sided. The 1541, made by Commodore, is the most common single-sided drive for the C-64. ►

BY ELLEN RULE

A monitor offers the best picture and color clarity.

The 1571 double-sided drive is used most often with the C-128, which, among other things, can utilize the 1571's faster speed and ability to read other disk formats.

There's a variety of 1541 clones available that will work with your C-64. The biggest inconvenience Commodore users have encountered with these units is lack of compatibility with some copy-protected commercial software. Since the problem varies with the drive manufacturer, such a purchase should be thoroughly researched to avoid disappointment. (Using the drive as your second, or data, drive usually doesn't involve copy-protection problems.)



Keep that mouse a-rollin'. . . It's Commodore's 1351 true proportional.

The monitor. Your computer is connected to either a television set or a monitor. While the television is an economical alternative, since it's almost certainly already in your home, a monitor offers the best picture and color clarity.

The first widely used monitor for the C-64 was the color-composite Commodore 1702, which provided access to the 64's color and sound. Later, Commodore's 1802 added a monochrome option, preferred by some for word processing and spreadsheet functions. The Commodore 1902 and 1902A monitors are designed for the C-128 and 128D, accepting RGBI (red-green-blue-intensity) input for 80-Column mode, as well as 40-column composite signals. The newest Commodore monitor, the 1084, can receive all of these signals, plus, should you be of a mind to upgrade, the RGBA (analog) signal sent by Amiga computers.

Many non-Commodore monitors are compatible with the C-64 and C-128. When considering a purchase for your C-64, look for a color-composite monitor. Your C-128 will benefit from a monitor that's switchable from composite to 80-column RGBI.

The printer. The next hardware item to select is a printer. Like the monitor, many people view a printer as optional when they're first starting out. However, they soon discover they're underutilizing their computer by not being able to print out the results of their work. (A word processor or graphics program isn't nearly as useful if you can view the results only on the screen!) A serial printer connects directly to the computer, and a parallel printer requires an interface. The printer may use a dot matrix printhead or a daisywheel.

Commodore is one of several manufacturers of direct-connect serial printers that are technologically up to date. These machines are plug-compatible with the serial port on the back of your disk drive. Unfortunately, this convenience is offset in some models by an inability to print italics, super- or subscripts, true descenders (where tails of letters such as q and p fall below the line) or near-letter-quality (NLQ) text. Print speed and dots-per-inch (dpi) capability should be scrutinized (80 dpi is recommended) when you're considering the purchase of one of these printers. A Commodore direct-connect printer is restricted to use with the C-64 or C-128, because the built-in interface makes it difficult to connect to any other computer.

Many people choose a non-Commodore parallel printer for greater flexibility and enhanced output, although these machines require a separate interface. Epson-compatible printers are common examples. I'd recommend that you look for a dot matrix parallel printer with text options, including NLQ. However, you might also want to consider a daisywheel machine, which is apt to cost more and be slower, but whose output looks like a typewriter's. Your Commodore-oriented salesperson or fellow Commodore users can show you the capabilities of various printers.

Input devices. The last piece of hardware in a basic Commodore system is an input device such as a joystick or mouse. Action games require a responsive joystick, perhaps with more than one fire-button for heightened alien-zapping ability. On the other hand, you might select Suncom's IconTroller, a tiny device that attaches to the right side of your C-128 or 64C keyboard. Conveniently out of the way, it provides low-profile access to software packages that require a joystick for menu selection.

Many people prefer a mouse for menu selection. Computer mice roll on a flat surface, such as a mouse pad, which provides a textured surface for smoother movement. The Commodore 1350 mouse (no longer being manufactured) functions like a joystick, while the Commodore 1351 mouse and Contriver Corporation's M-3 mouse are what is known as "proportional." This means that they offer (in Mouse mode) finer screen control, but only with software supporting proportional input. They can, however, function alternatively as a joystick when in their Joystick mode.

Other input devices that can be used with some software are the light pen and the touch tablet. The light pen is a hand-held, software-driven unit, with either push-button switches or a touch-sen-

sitive tip, that plugs into the computer's joystick port. The touch tablet is a flat-surfaced unit that transmits the movement of your finger or a stylus to the computer screen. This is usually accomplished via the joystick port.

When choosing an input device, remember that the software you plan to use must be able to interpret the signals sent by the device, and the device must be comfortable for you to use. Check your software documentation to determine the recommended input device. The best one for a CAD program may not be the best for menu selection with your word processor, and vice versa.

Other Hardware

Depending on your finances and the special applications you have in mind for your computer, you may want to think about add-ons such as a second disk drive, modem and memory expansion unit.

A second disk drive. If you plan to use your computer to manage information through word processing, a spreadsheet or data filing, you should consider a second disk drive to hold your data disk. Of course, your software must support two drives. (How can you tell? Check the manual or look for a "set-up" option on the screen.) Using a second drive for data storage saves a lot of disk swapping and preserves your original program disk (which really shouldn't be used for saving data).

The selection of a second disk drive opens up a new possibility—the Commodore 1581 drive. Its 3½-inch format provides almost six times the storage capability of the single-sided 5¼-inch drive! Because few software companies are issuing their titles on 3½-inch disks, I don't recommend buying this unit as a primary drive for use with commercial software. However, as a second drive for writing data files, the 1581 excels, not only by virtue of its increased storage capacity, but, when used with the C-128, its impressive speed.

If a program's documentation doesn't specify 3½-inch support, check with the manufacturer, a Commodore software vendor or someone who already uses the program before you take the financial plunge. Research your purchase to avoid software-hardware incompatibility problems!

A modem. Another specialized hardware add-on is the modem, which acts as an interface between your computer and the telephone line for access to local and national telecommunications services. Modem specifications vary in such factors as direct-connect capability, transmission speed (measured in baud rate) and internal controls.

As with printers, the modem you purchase may be a direct-connect unit or one requiring an interface. Several modems are available that plug directly into the C-64 or C-128 user port, including the 300-baud Commodore 1650 and the 1200-baud 1670. Non-plug-compatible units, requiring an RS-232 modem interface, may have enhanced features, as well as potential for use with other computers. They're a viable alternative despite a slightly higher cost.

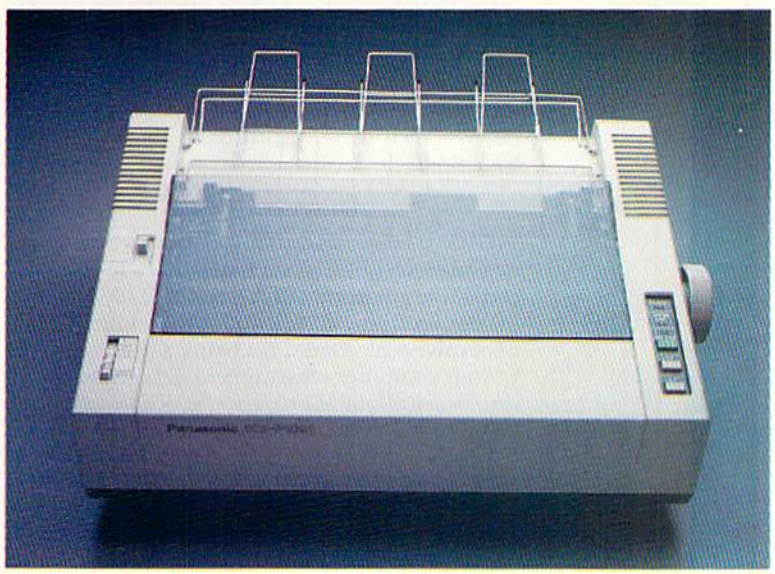
Common rates of data transmission for telecommunications on a Commodore computer are 300 and 1200 baud. If the online services you use charge by the minute for access time, a 1200-baud modem will save you money in the long run. On the other hand, your decision may be based on purchase price, and starting out with a low-cost 300-baud modem may be the smartest approach for your circumstances.

Whenever you consider hardware options, compatibility with your software is a major factor. The majority of Commodore telecommunications programs are based on traditional standards. For ease of use, your modem should be either 1650-compatible, for 300 baud, or Hayes-compatible, for 1200 baud.

Memory-expansion units. Commodore has produced three RAM expansion units (REUs) for use with the C-64 and C-128 computers: the 1700 and 1750 for the C-128 and the 1764 for the C-64. These units plug into the expansion port and add 128K (kilobytes), 512K and 256K of memory, respectively.

RAM expansion can be used like a disk drive, and access to a RAM disk is virtually instantaneous, because it has no mechanical parts. However, like the RAM in the computer itself, Commodore RAM expansion units lose the contents of their memory when the computer is powered down.

A common misunderstanding among Commodore owners is that the RAM expansion unit will automatically add accessible K to their active RAM. In fact, the C-64 has no way of knowing that the excess memory is in place, and there are no commands in Basic 2.0 to access it. Software support is critical here! In contrast, the C-128 can access the REU using Basic 7.0 or CP/M, both built in. GEOS, Basic 8 (for the C-128) and some ►



Panasonic's KX-P1091 dot matrix printer features NLQ, Draft and Compressed modes.

It's wise to make backups of your programs and data.

word processors, by Professional Software, Digital Solutions and Xetec, among others, take advantage of the speed and storage capability of the RAM expansion units.

An alternative to the volatile REU is a battery-backed RAM, such as the Quick Brown Box. This device, too, plugs into the expansion port of your computer and provides instant access to your stored programs, data, utilities or games. However, its lithium battery preserves the memory even when the cartridge is unplugged. RAM expansion units and the Quick Brown Box, as well as other cartridges, can be used together via devices such as the Aprospand Cartridge Port Expander.



Suncom's IconTroller doesn't take up much space and works well with games.

Organization

Disk storage units. Disk storage boxes are designed to hold 50 or more disks in a clean, static-free environment. They're usually made of plastic and may have locking capability. More expensive teakwood units bring a designer look to your computer environment. Of course, if you don't care about appearance, a clean cardboard box like a shoe box will do just as well.

Smaller disk cases will carry five to 15 floppies safely to school, work or computer-club meetings. Some of these units snap together to provide a versatile transportation/storage system.

System organization. Good hardware organization and adequate work space are critical to efficient computer operation. Finances and personal taste will be the major influence on your layout. Your scheme may consist of a tilt-and-swivel monitor base, an economy printer stand and a surge-suppressing power strip. Either a home-built shelf or a commercial computer desk will support your monitor at a comfortable viewing height and elevate your printer for convenient paper storage. A system organizer, such as the Ketek Command Center, combines compact storage and support for your computer, disk drives and monitor, while also providing surge suppression and a cooling fan.

Software: The "Big Four"

Many people buy a computer "to get organized," hence the "big four" of applications software: word processors, databases, spreadsheets and telecommunications programs.

A word processor is used to produce text documents. For writing letters, you might choose an inexpensive, easy-to-use package. More advanced applications (such as term papers, form letters and newsletter production) require a multifeatured program.

Selecting word processing software can be tough, particularly for newcomers. Drop-down menus, WYSIWYG (what-you-see-is-what-you-get) displays and on-screen help may all be useful. Try out various programs and choose the one with the features you like best.

Databases are programs that file text information. Tidying up all those scraps of paper with phone numbers and addresses, cataloging your video-cassette library or tracking the inventory of your home-based business can be accomplished with this tool. A good database features flexible layout, room for a large number of entries and swift, versatile sorting capabilities.

For management of numeric data, or "number crunching," you should have a spreadsheet. Think of this application as a large electronic sheet of columnar paper into which you can plunk numbers, text and formulas. The figures can be calculated and recalculated at will, allowing you to easily explore "what-if" options. Keeping your budget, tracking the family's bowling scores and producing sales invoices are all functions at which a spreadsheet shines.

Telecommunications software is your computer's link to the outside world. You may want to gather information from an electronic encyclopedia service, check stock market trends, chat with users across the country through a national telecommunications network, or download games and utilities from a local bulletin board system (BBS). QuantumLink, the Commodore network, is by far the easiest nationwide service for Commodore users to access and use, since the parameters on the Q-Link software are preset, and, once you're online, choices are menu-driven. Other national networks are accessible via general-use telecommunications software. Subscribers to these and local BBSs quickly learn the command sequences that will let them take advantage of the many services available through the telephone lines.

As you research the purchase of applications software, you'll no doubt encounter "integrated packages." As separate units or in specially priced sets, the programs in these packages can read and use the information produced by one another. With an integrated package, you can draw financial data from a spreadsheet into a text report, produce copies for individuals se-

lected from your database, then upload those files to a telecommunications network for electronic mail delivery. Most of us don't need anywhere near that much capability, but incorporating the family's PacMan scores into the annual Christmas letter and producing graphics-enhanced mailing labels might be fun!

When selecting your applications software, ask yourself questions regarding hardware compatibility. Will my telecommunications software allow me to use my modem? Will this word processor support my printer? Will the data files be compatible with my 1581 drive? Magazine reviews, manufacturers' promotional literature and the opinions of fellow users are excellent guides when it's necessary to make software selections.

Other Software

The fluid memory and graphics capabilities of the personal computer have inspired "desktop publishing," my nomination for turning the "big four" into the "big five." With a desktop publisher, Commodore users can combine graphics and text to create professional-looking newsletters and flyers, a task that used to require typesetters, artists and other costly specialists.

Fast-loaders and utility cartridges help manage the computer and its peripherals. In addition to speeding up the notoriously slow Commodore 1541 drive, they can let you capture a graphics screen on disk or dump it to a printer, back up (copy) disks for archival purposes, edit the machine language component in memory and add Basic programming enhancement (toolkit) functions.

Perceiving the possibility of a better way to access the computer and all of its obscure functions, Berkeley Softworks developed GEOS, the Graphic Environment Operating System. GEOS provides access to disk and printer through a graphic instruction set, rather than the usual typed commands, and a framework within which software applications, as well as disk utilities and games, can be run. The manufacturer of GEOS produces some such programs, including the geoWrite word processor, the geoFile database, the geoCalc spreadsheet, the geoPublish desktop publisher, and more.

Up to this point, my discussion has referred to commercial software, which, like any other authored work, is subject to copyright by the author or publisher. Public domain software, on the other hand, consists of programs that have been released by the author, so they may be freely distributed and copied by anyone, and at very low cost. Many outstanding programs are available through the public domain; in fact, they constitute the largest portion of ethically managed computer club libraries and bulletin board files.

When it's permissible to do so, it's wise to make backups of your programs and data, and commercially produced copying utilities simplify the process. However, duplicating copyrighted software and distributing it to others is illegal. Please buy the software you need, and give the authors their deserved royalties!

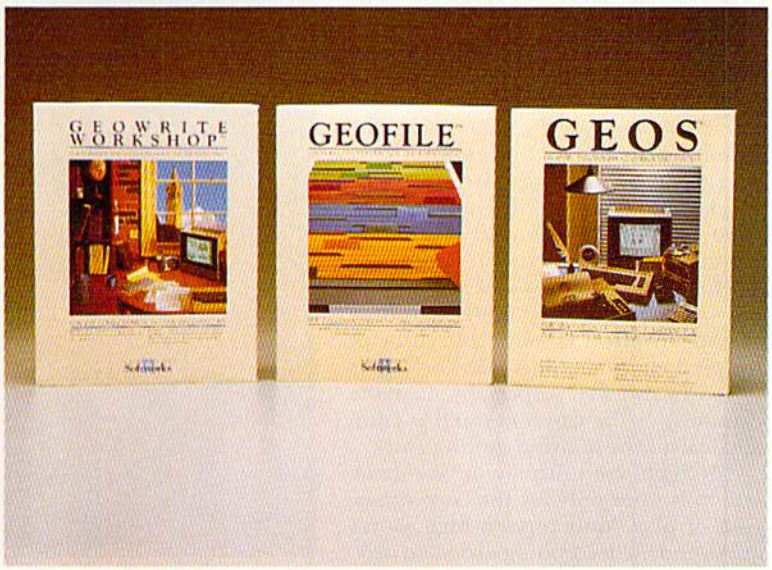
Information and Assistance

Books with helpful information for new Commodore users aren't difficult to find, since both the 64 and 128 have now been around for several years. Browse through your book store's shelves for titles on using the Commodore 64 or describing practical uses for the home computer; then check the table of contents closely to be sure the topics match your interests. At the birth of the C-64, software wasn't readily available, so most texts from that era devote inordinate space to Basic programming.

Magazines such as *RUN* are a good way to get up-to-date information about using your Commodore computer. The wide range of subjects may seem overwhelming to a new user, but scanning a magazine's table of contents can let you spot the subjects of particular interest to you. Also read the letters column; you'll be amazed at how many others are having the same problems or asking the same questions as you are!

QuantumLink is another excellent source of information on using your computer. It puts you in touch with computer professionals, as well as other knowledgeable users willing to share their experiences.

Last but not least, don't forget your local user's group—your direct route to personal assistance and exposure to diverse interests and abilities. The experienced users in your club were all beginners once, and most will be glad to share valuable advice about getting the most from your computer system. ■



Just a sampling of the many GEOS-compatible applications from Berkeley Softworks.

In addition to full-time work as a Psychiatric R.N. and extensive involvement in user group activities, Ellen Rule uses her three Commodore computers to manage a home-based business, Home Computer Resource.

Inertia Mania

You ought to feel delightfully bouncy after a session with this resilient arcade game.

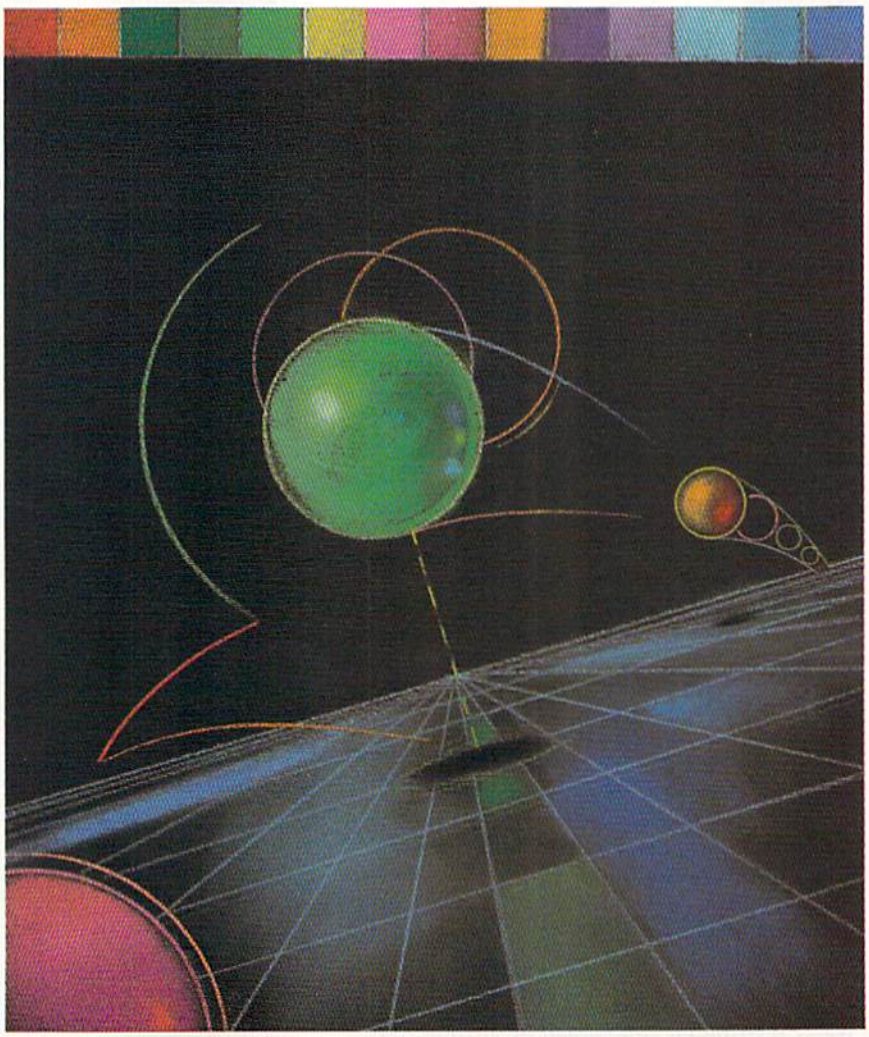
By CHARLES ORCUTT

If you've never been in a rubber room, Rubber Bandit Ball provides a golden opportunity to feel what it's like. In this smooth-scrolling, multiscreen arcade game, you use a joystick in port 2 to control a rubber ball as it bounces through corridors, trying to snatch up little golden nuggets. Guiding the ball is hard enough, but merciless cannons fire killer balls through the corridors periodically, and the rubber ball loses one of its five lives if it collides with one. A clock allows you 99 seconds to gather up all 95 nuggets, and the ball also loses a life if it runs out of time. When the ball does get all the nuggets, you proceed to the next level, where the cannons fire faster killer balls more frequently.

For each nugget snatched, you get the number of the current level in points. In other words, in level two, each nugget is worth two points. You pause the game by hitting the fire-button, and you start over again by pressing restore.

Like most objects in this universe, the rubber ball has inertia, so it tends to continue in the direction it's going. As a result, moving the joystick is like blowing on the ball or pulling it with a spring; the effect is subtle and difficult to predict. Sometimes the ball gets mired in the wall (especially near the cannons), so be careful. You'll eventually learn how to avoid getting stuck.

The high-score display on the game screen is valid only for the current session of play. Your top-ten high scores are stored, in descending order, on disk. When you run out of lives and play ends, the game boots the high-score file and checks to see whether your current score should be included. If so, enter your initials by moving the joystick up and down to cycle through the alphabet and left and right to move between your initials. When you press the fire-button, the new top-ten roster is saved and another game commences. The high-score routines of some games have you press the fire-button as you enter the letters. Be sure not to do that here, or you won't get your initials placed.



Rubber Bandit Ball takes the form of a hex loader (Listing 1). Type in that listing with *RUN*'s Checksum and run it once to generate a copy of the game in pure machine language. Then all you need do to play is enter LOAD "+BANDIT BALL ML",8,1 and SYS 32768.

Prior to playing Rubber Bandit Ball, ►

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

ILLUSTRATED BY ANDRZEJ DUDZINSKI

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Superbase 128		49
Superbase 64		44
Superbase 128/1581 drive		**call
Swiftcalc 128 w/Sideways		39
Swiftcalc 64		17
TAS 128		42
TAS 64		29
Timeworks Business Series	EA	39
Vizistar 128		60
Viziwrite Classic 128		60
Wordwriter 128		39
Wordwriter 3		30

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Body Transparent		22
Early Learning Friends/PRE		6
Facemaker/PRE		18
Galactic Frontier		22
Kindercomp/PRE		18
Stickybear ABC's/PRE		22
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Stickybear Shapes/PRE		22
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Stickybear Typing/5-8		22
Jungle Book (Reading 2) / 6-9		19
Kidwriter/6-9		22
Mathbusters/6-9		9
Stickybear Math 2/6-9		22
Stickybear Spellgrabber/6-9		22
Stickybear Townbuilder/6-9		22
First Men on Moon Math/9 +		19
Stickybear Read Compreh./9 +		22
Evelyn Wood Dynamic Read/11 +		17
Pro Tutor Accounting/14 +		69
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Geocalc 128		45
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Graphics Galleria Pak 1 OR 2	EA	24
Graphics Integrator 2		24
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Kracker Jax Volumes 5-7	EA	17
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GEOS Prog Ref Guide 2	17
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K Jax Revealed Book 2	23
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MISCELLANEOUS

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C128 OR 1571 Cover	EA	9
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Quick Brown Box - 64K		99
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you must type in and run the program called Hi-Score (Listing 2). Otherwise, the game won't find the top-ten list, and you'll get garbage on the screen.

Don't use a fast-load cartridge with Rubber Bandit Ball. My cartridge causes errors when the program tries to store the high-score file, and I couldn't figure a way around the problem. Just use the standard Commodore DOS. R

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

Listing 1. Rubber Bandit Ball program.

```
Ø REM CREATE BANDIT BALL ML
                        :REM*179
5 OPEN 8,8,8,"+BANDIT BALL ML,P
  ,W"                   :REM*214
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
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 BANDIT BAL
    L                   :REM*28
1Ø1 DATA ØØ8Ø4CØ88ØØØØØAAØ7ØB A
    9ØØ8D2ØD Ø8D21DØAØØØ B9618EF
    ØØ72ØD2FFC84C       :REM*24
1Ø2 DATA 128ØEEED8EADED8E29ØF 8
    DED8EAØ2799FØD8881Ø FAA5C5C
    93CDØE7AØØØB9       :REM*159
1Ø3 DATA F28F99ØØ7ØB9F29Ø99ØØ 7
    1B9EE8E99ØØ4ØC8DØEB A94E8D1
    8Ø3A98Ø8D19Ø3       :REM*176
1Ø4 DATA 2Ø5489A9ØØAØØ2991698 8
    81ØFA2Ø5D882Ø9E882Ø C38CA9Ø
    Ø85FBA96885FC       :REM*116
1Ø5 DATA AØØØA9ØØA2Ø791FBC8DØ F
    BE6FCCA1ØF6AØØØB9ØØ 7199ØØ6
    9B9ØØ7299ØØ6A       :REM*97
1Ø6 DATA C8DØF1AØØØA92Ø992Ø7B 9
    92Ø7FC8CØC8DØF5A9ØØ 8DF97F8
    DF97B8D1C982Ø       :REM*166
1Ø7 DATA BE872Ø2388A9Ø18D27DØ 8
    D28DØ8D29DØ8DF87F8D F87B8D1
    C982Ø1A88AØ5        :REM*161
1Ø8 DATA 8D1D982Ø1E89AØ28DFA 7
    F8DFA7BA9Ø38DFB7B8D FB7F8DF
    C7F8DFC7B2ØDE       :REM*31
1Ø9 DATA 88A95785FBA99885FCAC 2
    398B91198AØØØ91FB18 A5FB69Ø
    185FBA9ØØ65FC       :REM*159
11Ø DATA 85FCEE2398AD2398C9Ø5 D
    ØØFEE2798AD2798C928 FØØ8A9Ø
    Ø8D23984CF78Ø       :REM*54
111 DATA AØØØA96Ø91FB2Ø8488AD Ø
    588D23DØADØ68Ø8D22 DØADØ38
    Ø8D21DØADØ48Ø       :REM*215
112 DATA 8D2ØDØ2ØAF88A9Ø385FB A
    99885FCA22A2ØF988A9 F285FBA
    99785FCA2322Ø       :REM*7
113 DATA F988A9Ø985FBA99885FC A
    24Ø2ØF988A9F885FBA9 9785FCA
    27A2ØF988A9FD       :REM*92
114 DATA 85FBA99785FCA29Ø2ØF9 8
    878A9DØ8D12DØAD11DØ 297F8D1
    1DØA9818D1ADØ       :REM*197
115 DATA A9D18D14Ø3A9858D15Ø3 2
    ØØB89ADØEDC29FE8DØE DC58AD1
    EDØAD1FDØAD12       :REM*24
116 DATA DØ38C9FC9ØF8AD2B98DØ Ø
    32ØDC81AD2B98DØØ34C BE812Ø5
    4874CBE81AD1F       :REM*217
117 DATA DØA8CE3798DØ29A9Ø18D 3
    798982 9Ø1FØ1FAD3698 49Ø38D3
    698A9Ø68D3798       :REM*194
118 DATA A9128DØ4D4A9138DØ4D4 8
    DØED4A9Ø18D1F98CE38 98DØ29A
    9Ø18D38989829       :REM*57
119 DATA Ø2FØ1FAD339849Ø38D33 9
    8A9Ø68D3898A9128DØ4 D4A9138
    DØ4D48DØED4A9       :REM*6Ø
12Ø DATA Ø18D1F982Ø9Ø89CE3998 D
    ØØBA9Ø48D3998Ø9F83 2Ø3Ø842
    ØØ6842Ø978418       :REM*58
121 DATA AD8DØ6D1C988DØ8DØ9Ø Ø
    8AD1ØDØ491Ø8D1ØDØ38 ADØ6DØE
    D1C988DØ6DØBØ       :REM*141
122 DATA Ø8AD1ØDØ49Ø88D1ØDØ2Ø 1
    F8718A9A465FB85FBA9 ØØ65FC8
    5FC18A5FC69Ø1       :REM*53
123 DATA 85FCAØØØB1FBC911DØ31 9
    891FB18A5FD693485FD A9ØØ65F
    E85FE18A5FE69       :REM*121
124 DATA Ø385FEAØØØ9891FD2ØBE 8
    7EE2698A9Ø18D2198A9 218DØBD
    4A9148D22982Ø       :REM*243
125 DATA 2789AD2698C95FDØ1AEE 1
    C982Ø5D882Ø49892Ø54 892ØC38
    CA9ØØ8D15DØ2Ø       :REM*39
126 DATA 1A882ØØB89CE2498DØ13 A
    93C8D2498F838AD2598 E9Ø18D2
    598D82Ø7D89AD       :REM*2ØØ
127 DATA 1EDØA829Ø8DØØA98291Ø D
    ØØ5AD2598DØ252ØB989 CE1D98F
    Ø432Ø5D882Ø49       :REM*216
128 DATA 892Ø54892ØC38CA9ØØ8D 1
    5DØ2ØØB892Ø1E89AD1E DØAD1FD
    ØADØØDC291ØDØ       :REM*186
129 DATA 1E2Ø4989ADØØDC291ØFØ F
    9ADØØDC291ØDØF92Ø54 89AØØØA
    2ØØE8DØFDC8DØ       :REM*151
13Ø DATA FA6Ø2Ø4989A9E885FBA9 9
    785FCA2842ØF9882Ø86 87ADØØD
    C291ØDØF9A98Ø       :REM*118
131 DATA 8D1ADØ78A9318D14Ø3A9 E
    A8D15Ø358A9ØØ8D15DØ 2Ø5D882
    ØØB8A4C4E8ØAD       :REM*133
132 DATA ØØDC29Ø8FØØ8ADØØDC29 Ø
    4FØ2D6ØAD3698C9Ø1FØ 1ØCE349
    8DØØ5A9Ø18D34       :REM*117
133 DATA 98A9Ø28D36986ØEE3498 A
    D3498C9Ø5DØØAA9Ø48D 3498A9Ø
    Ø8D36986ØAD36       :REM*118
134 DATA 98C9Ø2FØ1ØCE3498DØØ5 A
    9Ø18D3498A9Ø18D3698 6ØEE349
    8AD3498C9Ø5DØ       :REM*1Ø9
135 DATA ØAA9Ø48D3498A9ØØ8D36 9
    86ØAD3698C9Ø2FØØ5C9 Ø1FØ1Ø6
    ØCE3598DØØ9AD       :REM*179
136 DATA 34988D35982Ø36856ØCE 3
    598DØØ9AD34988D3598 2ØED846
    ØADØØDC29Ø1FØ       :REM*1
137 DATA Ø8ADØØDC29Ø2FØ2D6ØAD 3
    398C9Ø1FØ1ØCE3198DØ Ø5A9Ø18
    D3198A9Ø28D33       :REM*227
138 DATA 986ØEE3198AD3198C9Ø5 D
    ØØAA9Ø48D3198A9ØØ8D 33986ØA
    D3398C9Ø2FØ1Ø       :REM*161
139 DATA CE3198DØØ5A9Ø18D3198 A
    9Ø18D33986ØEE3198AD 3198C9Ø
    5DØØAA9Ø48D31       :REM*135
14Ø DATA 98A9ØØ8D33986ØAD3398 C
    9Ø2FØØ5C9Ø1FØ1Ø6ØCE 3298DØØ
    9AD31988D3298       :REM*1Ø8
141 DATA 2Ø7F856ØCE3298DØFAAD 3
    1988D32982ØA8856ØAØ ØØ2Ø1F8
    7A2ØØAØØØ2Ø57       :REM*73
142 DATA 9818A5FB692885FBA9ØØ 6
    5FC85FC18A5FD695Ø85 FDA9ØØ6
    5FE85FEE8EØ14       :REM*226
143 DATA DØDC6ØAD2B98DØ4318AD Ø
    6DØ69Ø18DØ6DØ9ØØ8AD 1ØDØ49Ø
    88D1ØDØ18ADØ8       :REM*14
144 DATA DØ69Ø18DØ8DØ9ØØ8AD1Ø D
    Ø491Ø8D1ØDØEE2E98AD 2E98C9Ø
    8FØØ34C3585A9       :REM*231
145 DATA ØØ8D2E98A9Ø38D2C988D 2
    A988D2B986ØAD2B98DØ 4338ADØ
    6DØE9Ø18DØ6DØ       :REM*143
146 DATA BØØ8AD1ØDØ49Ø88D1ØDØ 3
    8ADØ8DØE9Ø18DØ8DØBØ Ø8AD1ØD
```

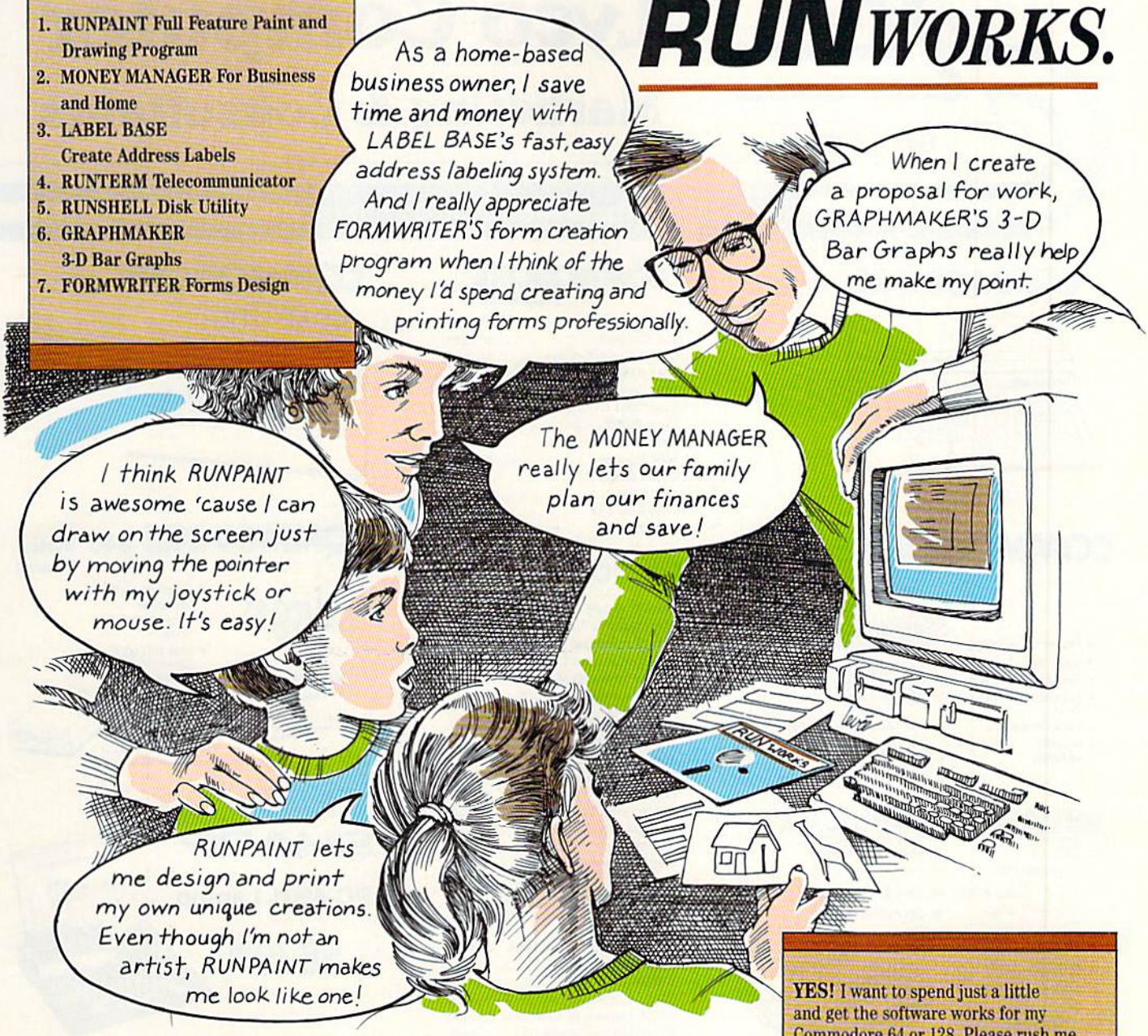
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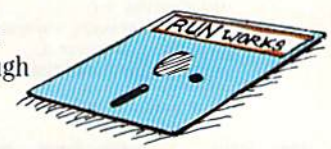
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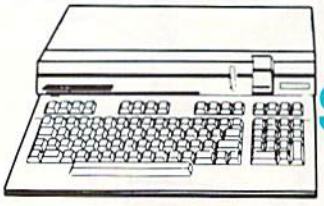
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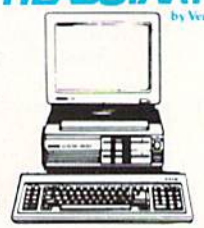
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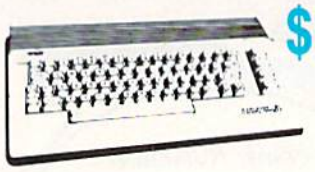
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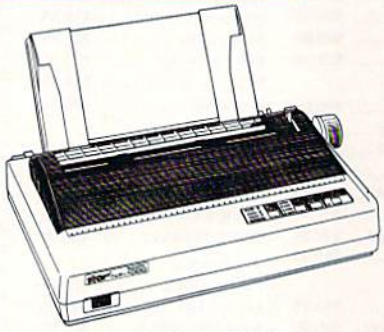
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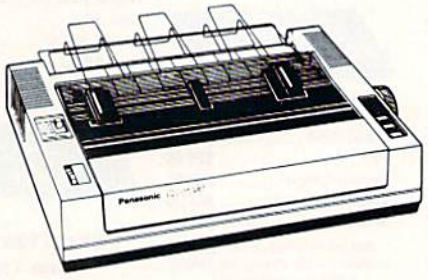
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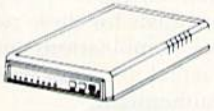
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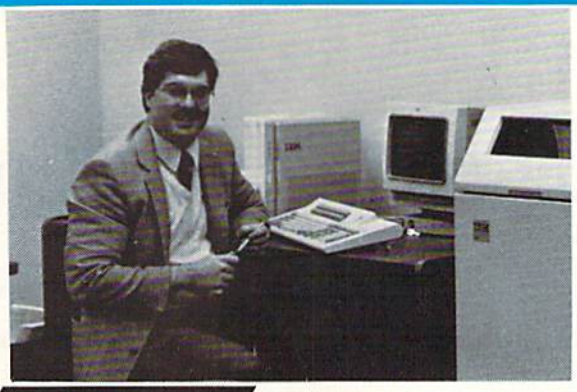
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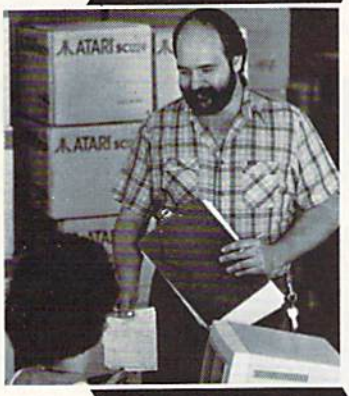
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Forward into Battle!

Alexander, Custer, Rommel, Patton and Rambo—re-create their battles or design your own with war-game construction sets.

By GERALD McLAIN

"Cannon to right of them/ Cannon to left of them/ Cannon behind them/ Volleyed and thundered. . ." If those lines from Tennyson send you running to your computer for the excitement of battle, then you're a true video warrior. If you enjoy playing commercial war games, perhaps it's time to add a dimension to your fun by creating your own confrontations. There are some excellent construction sets available for doing just that.

Three types of war games can be created with these programs. The first simulates historical battles. If you have a special interest in the Battle of Hastings or the counterattack on Pork Chop Hill, it's possible, with judicious use of digital "game pieces," to re-create those battles on your computer screen. Construction sets are available to simulate anything from small unit actions to full-scale land, sea and air assaults.

You can also use construction sets to answer "what-if?" questions about past battles. Suppose the Germans had had a heavy strategic bomber to use during the Battle of Britain. Would England have stood? A reasonable guess can be made by generating a heavy bomber force to press the battle. With careful attention to strategic detail, a computer can help you see how history might have been different.

A third use of construction sets is to engage in pure fantasy battles. The movie *Final Countdown* sends the USS Nimitz back in time to encounter the Japanese just before Pearl Harbor, but leaves off with the Nimitz returning to its own time. A construction set would let you play out the scenario all the way to the end.

A Sampling of Programs

War game construction sets are all flexible, but to varying degrees. Some are open-ended, allowing almost anything imaginable; others are quite rigid, allowing only a few alternatives. Here's a survey of some of the programs currently available, with an eye toward their options and flexibility.



In Lords of Conquest, you can make modifications to a map of the U.S.



Your initial placement of ships in Wooden Ships and Iron Men is crucial.

Field of Fire, Computer Ambush and 50 Mission Crush, from Strategic Simulations, Inc. (all distributed by Electronic Arts), are hardly construction sets at all, but rigid game systems with interchangeable characters. Field of Fire lets you change the names of squad leaders while fighting a series of battles across World War II Europe. Computer Ambush allows man-to-man combat in several battles, with provision for changing the combatants' abilities, and 50 Mission Crush lets you name the aircrew of a B-17 on bombing missions.

I've used the names of acquaintances for the characters; it increases the excitement and fun. The play system in these games lets your characters gain experience and ability, and, as with most computer war games, you can play them alone. Of course, with no actual construction available, special simulations aren't possible.

In Lords of Conquest, from Electronic Arts, you construct your own map on which to play. In much the same way as the Parker Brothers' board game, Risk, Lords can be customized to portray any time period or territory, from an historical or fantasy event to your own neighborhood. However, despite its mapmaking utility, Lords is not realistic; it's more of an electronic strategy board game, with lots of options.

The construction set concept reaches higher levels in games like Strategic Simulations' Mech Brigade, Warship and Eagles (again, all distributed by Electronic Arts). All have a variety of built-in scenarios, but also allow you to design custom games, providing a utility for making your own map and then placing the appropriate ships, helicopters or land vehicles on it. Once construction is completed, you're free to play either side. While Mech Brigade allows only certain types of weapons, both Warship and Eagles let you alter a variety of factors to create unlimited types of ships and planes. The manuals for these two games list possible combinations and give examples of actual historical hardware to enhance authenticity.

If your tastes run toward Napoleonic sea combat rather than the 20th century, Wooden Ships and Iron Men, from Avalon Hill, places you in command of your own ships of the line. You can design historical or fantasy scenarios by draw- ►

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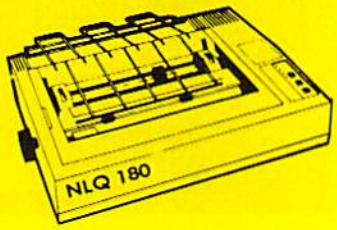
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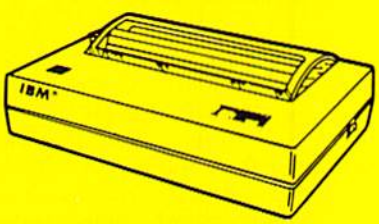
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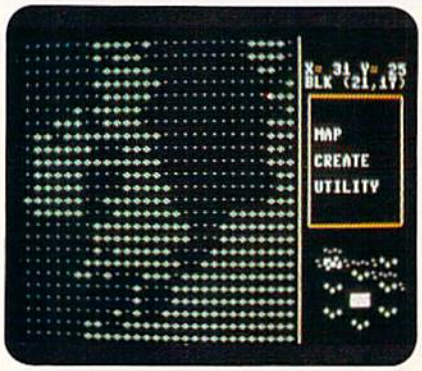
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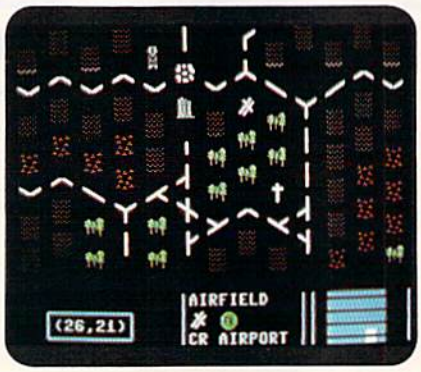
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Take a look at the map of the British Isles in Europe Ablaze.



You can design a detailed scenario in the Halls of Montezuma.



You've reached the unit-deploy phase of Wargame Construction Set.

ing a map and inserting a variety of ships from over 200 classes.

Sea, Air and Land

Grand sea, air and land warfare simulations have come into their own with Carriers at War, Europe Ablaze and Battlefront, a trio of programs also distributed by Electronic Arts. The wide variety of challenging World War II scenarios built into these programs demonstrates the construction options included. Each game allows battle components to be generated from the bottom up, including individual ships, aircraft and land battalions that are deployed on a specially created map, with allowances for almost any factor that could affect play. Depending on the game, everything from weather and the effect of rivers on air navigation to ship control capabilities and the combat experience of troops is not only weighted in game play, but changeable in construction.

You can simulate almost any type of encounter here, including "fantasy" battles like the *Final Countdown* scenario described above, and games can be saved in progress and modified as necessary. Attesting to its flexibility, Battlefront has spawned a variety of other packages, including Halls of Montezuma, which simulates U.S. Marine Corps combat, and Battles of the American Civil War.

Another flexible package, Wargame Construction Set, from Strategic Simulations and also distributed by Electronic Arts, utilizes the game system used in Field of Fire. This program lets you design various terrains, unit types and adversaries, and comes with sample scenarios that range from medieval castle sieges and the Civil War to World War II, modern-day hostage rescue missions and science fiction. Scenarios can be programmed for one or two players in four different combat scales, from

Evolution of the War Game

FOR MANY OF US, IT ALL BEGAN with TV shows like the '60's Combat! or movies like the '80's *Rambo* series. We lived the excitement vicariously, and then wanted to experience a measure of it firsthand.

Long before, though, games like chess let players feel the thrill of victory without drawing a sword. More recent board games provided an element of realism that spawned a whole new generation of war gamers. Games such as Cross of Iron from Avalon Hill are so detailed that a first-time player is often daunted by their complexity. The ultimate in flexibility and complexity appears in TSR's Dungeons and Dragons.

However, with a few exceptions, there are two major problems with these games. First, there's no animation on the game board. Moves are made just as in chess—by manually moving the pieces. Second, the game usually requires at least two players, and sometimes more. How can you watch a battle unfold or enjoy playing alone?

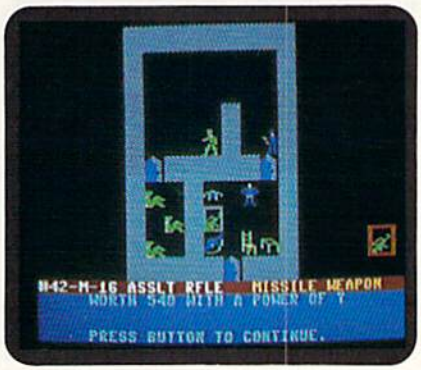
The answer came a few years ago when marvelous toys called video games hit the market. First, you could shoot a cannon at advancing aliens or low-flying airplanes; then, as microchips became more sophisticated, so did the games. A player of Mattel's Intellivision could fly down the trench of a death-star, fighting off alien ships and bombing laser batteries to save the earth.

The wonder of these games came partially from the TV set. While the screen had once shown *Twelve O'Clock High* as a movie for you to watch, now it became the flight deck of a B-17, which you could fly over Europe with a crew represented by synthesized voices. The success of the newest crop of such amusements attests to their continuing popularity.

Gamers could take control of their TV sets, but still they wanted more. It came in the form of text adventures for the microcomputer, where the player typed in his or her name at the beginning of the session and was "spoken to" throughout. The excitement of "personally" playing the game was the next best thing to being there.

However, these games offered few or no graphics and little flexibility. Once the mystery was solved, the adventure lost meaning. Also, the gamer was at the mercy of the programmer's perception of reality. What if the game could be changed?

Enter the construction set. At last, the "game" was not a game, but a framework that let players construct their own conflict scenarios, then participate in them. Here, finally, was real gaming! □



Among the possibilities in Adventure Construction Set is weapons placement.

man-to-man to strategic actions.

Wargame Construction Set is probably the most flexible war game design program currently on the market. Its only fault is that units can't be named within the program, except by number and unique icon. However, its other flexibilities more than compensate for this limitation.

The C-64 version of Avalon Hill's Under Fire has tremendous capability for simulating World War II land battles. You can choose the type of action (attack, delay, hold position or breakout) and the objective, not to mention the armament and makeup of troops and vehicles, and an optional companion disk lets you create custom maps. The complete package makes a definitive design program and play system.

Adventure Construction Set from Electronic Arts was designed as a graphics adventure generator but is adaptable to war games, too. One of the first construction sets available, it still ranks as one of the most flexible, enabling you to simulate any man-to-man combat situation conceivable. You can't even draw the map until you've constructed your graphics "pieces." Weapons, terrain features, transport, miscellaneous items and nonplayer characters are all drawn, given qualities and incorporated into the game. I'm currently using the program to generate a game loosely based on the role-player Twilight 2000 from Game Designer's Workshop. It's a daunting project, taxing my imagination to fully use the many construction options available.

Preparing for Battle

Suppose you have a construction set and want to create a new scenario or campaign. How is it done? The following are a few ideas I've found that make creating a game as much fun as playing it.

The first thing required is information. You must develop an idea and "flesh it out" into a realistic conflict that can be simulated on the computer, and this can be done only through research. If you're interested in historical simulations, you probably already own books on the subject. Read everything you can so you'll understand what happened and why. Only then can you construct a realistic confrontation.

One mistake in developing a concept for a scenario is starting too big. If you plan to simulate the entire Pacific War from 1941 to 1945, you'll probably lose interest in your game long before you generate anything playable. Try to keep your first efforts simple—like the final confrontation at Little Big Horn, not the fall of the entire Indian nation.

While books are your best source of ideas, you can also learn from TV and movies. They may not give accurate historical information, but you'll be inspired to complete your Sands of Iwo Jima campaign after you watch Sgt. Striker lead his men to victory. Movies and TV can also help you visualize the battle and make play more fun.

It's vital that you use your imagination in game construction. It's difficult, if not impossible, to get the full story on historical confrontations, and, if you're doing a "what-if" scenario, everything is up to you.

The steps in building a scenario depend on the construction set you're using, but the following are always appropriate:

1. Design the scenario. With some sets, like Adventure Construction Set, you begin by drawing graphics to represent the items and people you need. With other sets, like Battlefront and Warship, it's a matter of categorizing the terrain features, ships, and such, to reflect a specific type of battle.

Remember, at this point you set the capabilities for everything to come later, so it's better to have too many ship types, landforms or air squadrons than not enough. If you've done your homework, you may know exactly what you need, but chances are you'll forget several things.

It's a good idea to write down all your plans before entering data. This will help avoid corrections later, and, with step-by-step notes about the construction process added, the paper record will be handy for reference. You might also play with the construction routines a bit, to get an idea of how they work, what they can create and how that applies to your simulation.

2. Draw your map. If you're working on an historical scenario, refer to an atlas to make the map as realistic as possible. As examples, be certain to allow for width and depth of rivers (effect on fording) and amount of cover (effect on visibility for firing). Drawing the map may take more time than any other part of the construction, but it's well worth every minute. Here again, it's a good idea to put your ideas on paper first, to make actual data entry easier.

3. Assign the combatants. If you had to construct the opposing forces during the first step, completing this one should be easy. Constructing combatants and assigning hardware is crucial to the playability of the game. If you're doing an historically accurate simulation, resist the temptation to add a little strength to one side or the other. If you're working on a "what-if" scenario, ►

Table 1. Manufacturers, distributors and prices.

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50 Mission Crush, $14.95;
Mech Brigade, $59.95;
Warship, $59.95;
Eagles, $9.95;
Wargame Construction Set, $29.95
Strategic Simulations, Inc.
1046 N. Rengstorff Ave.
Mountain View, CA 94043
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San Mateo, CA 94404

Wooden Ships and Iron Men, $35;
Under Fire, $34.95
Avalon Hill Game Co.
4517 Harford Rd.
Baltimore, MD 21214

Lords of Conquest, $14.95;
Adventure Construction Set, $14.95;
Carriers at War, $49.95;
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Battlefront, $39.95;
Halls of Montezuma, $39.95;
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try several possibilities—but don't give an overwhelming advantage to one side or the other. Also, if you want uninitiated players to enjoy your game, be certain it begins easily and becomes progressively harder. Encountering an invincible Minotaur in the first room of their first text adventure can turn new players off gaming forever. Give them a chance to learn the game with a minimum of frustration. Then, when they're "hooked," throw in the heavy stuff.

4. Set up the conflict. This is the most important part of ensuring a good game, but, if you've done some research and keep the peculiarities of your construction set in mind, it will also be the easiest. Just make sure your ships can't sail across dry land and your planes won't bomb nonexistent targets, and, if you expect to play solitaire, instruct the computer fully (using the game-play mechanic).

5. Be imaginative. If the construction set you're using doesn't allow for a unit type or condition you want, simulate the desired effect. For example, Wargame Construction Set provides no forts, but it does have a category of ship that lets troops hide inside. If you assign these ships a non-naval icon, then place them on dry land without a movement allowance but with large fire and defense capability, you'll have just what you need. Since construction sets are flexible, you can find a way to solve almost any design dilemma.

6. Test for playability. Many construction sets have an option to let the computer play itself. Use this option several times to see what happens. If it seems impossible for one side or the other to win, see if the construction set will award the losing side points, so it can hold out longer. The Allies probably can't win a battle like Operation Market-Garden, but the amount by which they lose can be decreased. This type of game can be more challenging than one in which winning is assured, and it's also a more accurate simulation of real battle.

A final bit of advice is to make and number a backup after every game-making session (and maybe once or twice within each session). The worst thing that could happen is for a power glitch or disk error to bomb hours of your hard work into byte oblivion.

With these suggestions and a good construction set, you should be able to simulate any type of conflict you desire. The fun is in the making—and the greatest compliment is when a friend completes your scenario and says, "That was a good game!" The satisfaction you feel at that moment will make it all worthwhile. ■

Jerry McLain is the Assistant Director of Staff Training at the Vernon (Texas) State Hospital. A self-taught computerist, he has developed a number of data-storage and record-keeping programs for IBM-PCs at work, as well as producing graphics on his home C-64 system for work-related projects, for the American Diabetes Association and for fun. A fascination with all aspects of war and the "what-if" concept provides him with a hobby for his spare time.

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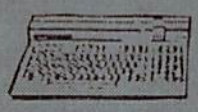
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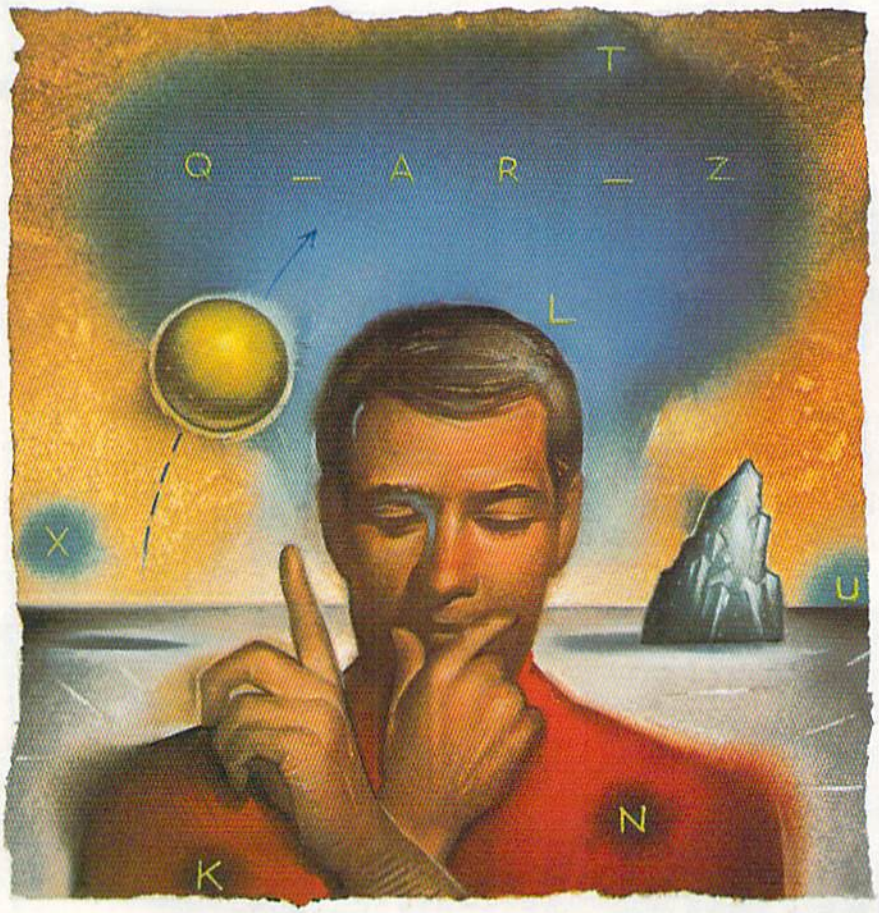
I Remember is a combination spelling and memory-improvement game that challenges you to remember and correctly spell lists of words in the shortest possible time. The nine difficulty levels each contain five words, with two-letter words at the first level, three-letter words at the second, and so forth. The game can be customized to fit anyone's ability.

Type in and save Listing 1. When you run the program, it briefly displays the five words at the first difficulty level; then the playfield appears. This field is a matrix of all the letters of the alphabet, with a light-blue ball in the center. Above the playfield is the time display. The computer picks one of the five words, then shows one clue letter from that word below the playfield, with the other letters represented by hyphens.

The clock is ticking, so you'd better start. Using a joystick in port 2, move the blue ball to the letter you think the first hyphen represents. Take care to move the ball in the spaces *between* the letters, for the ball turns yellow as soon as it touches *any* letter, and when it does, the die is cast: you have chosen *that* letter.

You can proceed to another letter only by guiding the (now) yellow ball to the star in the center of the playfield, at which point you hear a happy ping if your choice is correct, a dull bong if you're wrong. If you've chosen correctly, the letter will replace the hyphen; if not, try again.

Continue until the entire word is displayed. Then you'll advance to the next level.



CUSTOMIZING THE PROGRAM

To change the length of time that the lists of words are shown, increase or decrease the 4000 in line 260 of the program. If you want to play only with shorter words, decrease the 10 in line 240. For example, if you'd like the game to end after the six-letter words, change the 10 to 6.

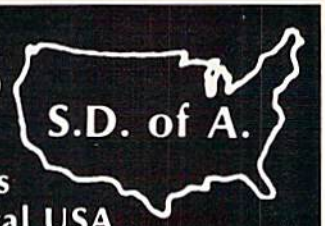
You may want to replace some or all of the words from time to time. They're located in Data statements beginning at line 630, with the two-letter words in line 630, the three-letter words in line 640, and so forth. When you replace words, be sure they're the correct length for that level and that you keep five in each Data statement. I'd also recommend that, within each level, no two words have the same letter in the same position. For example, if "but" and "pet" were in a list, the program might select one of them and "t" as the clue letter. Then, you couldn't guess the word until you'd chosen more letters, possibly wasting time. R

Penny DeGroff, a freelance author, writes educational and arcade games for the C-64. ►

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Circle 245 on Reader Service card.

REMEMBER

Listing 1. I Remember program.

```
1 REM I REMEMBER - PENNY DEGROF
  F                          :REM*2Ø6
1Ø DIMD$(2Ø),W$(5),B(26):PRINTC
   HR$(142):X=RND(-TI):GOTO48Ø
                              :REM*25
2Ø PRINTD$(5)TAB(12)LEFT$(TI$,2
   )":"MID$(TI$,3,2)":"RIGHT$(T
   I$,2)                      :REM*144
3Ø FORDE=1TO5Ø:NEXT:JS=PEEK(563
   2Ø)AND15:IFJS=14THENDI=-4Ø:G
   OTO8Ø                      :REM*4
4Ø IFJS=7THENDI=1:GOTO8Ø
                              :REM*147
5Ø IFJS=13THENDI=4Ø:GOTO8Ø
                              :REM*143
6Ø IFJS=11THENDI=-1:GOTO8Ø
                              :REM*251
7Ø GOTO2Ø                     :REM*194
8Ø NP=OP+DI:TP=PEEK(NP):TC=PEEK
   (NP+C):IFTP=16ØTHEN2Ø
                              :REM*148
9Ø IFBC=7THEN13Ø              :REM*152
1ØØ IFTP=42THEN2Ø             :REM*95
11Ø BC=14:IFTP>ØANDTP<27THENBC=
   7:LC=TP                    :REM*18
12Ø POKENP+C,BC:POKEOP,PP:POKEN
   P,81:POKEOP+C,PC:OP=NP:PP=T
   P:PC=TC:GOTO2Ø             :REM*193
13Ø IFTP>ØANDTP<27THEN2Ø
                              :REM*255
14Ø BC=7:IFTP=42THENBC=14
                              :REM*135
15Ø POKENP+C,BC:POKEOP,PP:POKEN
   P,81:POKEOP+C,PC:OP=NP:PP=T
   P:PC=TC:IFTP=32THEN2Ø
                              :REM*76
16Ø LS=1Ø:IFLC+64=ASC(MID$(W$(W
   P),PL,1))THENLS=5Ø         :REM*56
17Ø POKES+1,LS:POKES+4,33:FORDE
   =1TO5Ø:NEXT:POKES+4,32:FORD
   E=1TO1ØØ:NEXT              :REM*149
18Ø IFLS=1ØTHEN2Ø             :REM*113
19Ø POKELP,LC                 :REM*157
2ØØ LP=LP+1:PL=PL+1:IFPEEK(LP)=
   32THEN23Ø                  :REM*2Ø8
21Ø IFPEEK(LP)<>45THEN2ØØ
                              :REM*212
22Ø GOTO2Ø                    :REM*91
23Ø TS$=TI$:FORDE=1TO15ØØ:NEXT
                              :REM*32
24Ø PRINTCS$:L=L+1:IFL>1ØTHEN41
   Ø                          :REM*121
25Ø FORX=1TO5:READW$(X):NEXT:WL
   =LEN(W$(1)):PRINTD$(1Ø)
                              :REM*94
26Ø FORX=1TO5:PRINTTAB((4Ø-WL)/
   2)W$(X):NEXT:FORDE=1TO4ØØØ:
   NEXT                       :REM*167
27Ø WP=INT(RND(1)*5)+1:LK=INT(R
   ND(1)*WL)+1                :REM*1Ø7
28Ø PRINTCS$D$(6)TAB(12)R1$"{15
    SPACEs}":GOSUB35Ø         :REM*157
29Ø PRINTTAB(12)R1$" "R2$"{2 SP
   ACEs}A B C D E{2 SPACEs}"R1
   $" ":GOSUB35Ø              :REM*38
3ØØ PRINTTAB(12)R1$" "R2$" F G
   H I J K "R1$" ":GOSUB35Ø
                              :REM*223
```



Move the ball carefully, or you'll choose a letter you don't want.

```
31Ø PRINTTAB(12)R1$" "R2$"{2 SP
   ACEs}L M "CHR$(113)" N O{2
   SPACEs}"R1$" ":GOSUB35Ø
                              :REM*248
32Ø PRINTTAB(12)R1$" "R2$" P Q
   R S T U "R1$" ":GOSUB35Ø
                              :REM*28
33Ø PRINTTAB(12)R1$" "R2$"{2 SP
   ACEs}V W X Y Z{2 SPACEs}"R1
   $" ":GOSUB35Ø              :REM*31
34Ø PRINTTAB(12)R1$"{15 SPACEs}
   ":GOTO36Ø                  :REM*152
35Ø PRINTTAB(12)R1$" "SPC(13)"
   ":RETURN                   :REM*3
36Ø OP=1523:PP=42:PC=14:REM*1Ø7
37Ø PRINTD$(19)TAB(12);:FORX=1T
   OWL:IFX<>LKTHENPRINT"-";:GO
   TO39Ø                      :REM*9
38Ø PRINTMID$(W$(WP),X,1);
                              :REM*46
39Ø NEXT:LP=1795:PL=Ø:IFL=2THEN
   TS$="ØØØØØØ"               :REM*2Ø3
4ØØ TI$=TS$:GOTO2ØØ           :REM*54
41Ø PRINTCS$D$(9)TAB(15)"GAME O
   VER"                       :REM*16Ø
42Ø PRINTD$(11)TAB(8)"TIME THIS
    GAME: ";LEFT$(TS$,2)":"MID
   $(TS$,3,2)":";             :REM*156
43Ø PRINTRIGHT$(TS$,2):IFTS$<BT
   $THENBT$=TS$               :REM*248
44Ø PRINTTAB(13)"BEST TIME: "LE
   FT$(BT$,2)":"MID$(BT$,3,2)"
   :"RIGHT$(BT$,2)            :REM*66
45Ø PRINTD$(14)TAB(4)"PRESS FIR
   E BUTTON TO PLAY AGAIN"
                              :REM*253
46Ø FB=(PEEK(5632Ø)AND16):IFFB=
   ØTHEN53Ø                   :REM*217
47Ø GOTO46Ø                   :REM*45
48Ø BT$="235959":D$(Ø)=CHR$(19)
   :FORX=1TO2Ø:D$(X)=D$(X-1)+C
   HR$(17):NEXT               :REM*163
49Ø B(1)=1478:FORX=2TO12:B(X)=B
   (X-1)+1:NEXT:B(13)=1529:B(1
   4)=1569                    :REM*233
5ØØ FORX=15TO25:B(X)=B(X-1)-1:N
   EXT:B(26)=1518:S=54272:C=54
   272:R1$=CHR$(18)           :REM*168
51Ø R2$=CHR$(146):CS$=CHR$(147)
   :FORX=S+2TOS+23:POKEX,Ø:NEX
   T:POKES,1Ø                 :REM*Ø
52Ø POKES+5,1Ø:POKES+6,1Ø:POKES
   +13,255:POKES+24,15:POKE532
   8Ø,Ø:POKE53281,Ø           :REM*52
53Ø PRINTCS$CHR$(28)D$(11)TAB(1
   4)R1$"{12 SPACEs}"         :REM*24Ø
54Ø PRINTTAB(14)R1$" "R2$CHR$(1
   58)"I REMEMBER"CHR$(28)R1$"
   "                          :REM*213
55Ø PRINTTAB(14)R1$"{12 SPACEs}
   ":CO=1:RESTORE:GOSUB58Ø:CO=
   6:RESTORE:GOSUB58Ø         :REM*77
56Ø CO=2:RESTORE:GOSUB58Ø:FORDE
   =1TO1Ø:NEXT:POKES+11,Ø
                              :REM*12
57Ø L=1:PRINTCHR$(154):FORDE=1T
   O1ØØØ:NEXT:GOTO24Ø         :REM*157
58Ø FORX=1TO26:POKEB(X)+C,CO:RE
   ADHI,LO:POKES+8,HI:POKES+7,
   LO:POKES+11,17             :REM*162
59Ø FORDE=1TO5Ø:NEXT:POKES+11,1
   6:FORDE=1TO1ØØ:NEXT:NEXT:RE
   TURN                       :REM*41
6ØØ DATA 14,24,8,97,11,48,18,2Ø
   9,22,96,1Ø,143,15,21Ø,21,31
   ,28,49                     :REM*42
61Ø DATA 33,135,28,149,22,96,28
   ,49,14,24,12,143,9,1Ø4,12,1
   43,15,21Ø                  :REM*179
62Ø DATA 21,31,28,49,33,135,18,
   2Ø9,12,143,9,1Ø4,12,143,16,
   195                        :REM*78
63Ø DATA TO,UP,IF,MY,AN:REM*1Ø6
64Ø DATA RUN,ACT,DOG,TRY,MAP
                              :REM*1
65Ø DATA BEAN,ECHO,KITE,JUMP,TA
   LL                         :REM*65
66Ø DATA SCARF,TRICK,PAPER,LIGH
   T,JELLY                    :REM*17
67Ø DATA REPORT,EDITOR,HANDLE,Q
   UARTZ,UNLESS               :REM*12
68Ø DATA PROGRAM,RESPOND,WHISTL
   E,SUBJECT,CAREFUL          :REM*55
69Ø DATA DELUSION,COMPUTER,APPR
   OACH,PRINCESS,BANKRUPT
                              :REM*69
7ØØ DATA HYPHENATE,SPLITTING,TR
   ANSPORT,FICTIONAL,GEOGRAPHY
                              :REM*84
71Ø DATA DICTIONARY,SPELLBOUND,
   INDUSTRIAL,WATERMELON,CHANG
   EABLE                      :REM*58 ■
```

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RN988

Programmer's Pager

Step through your program listings conveniently at the press of a key.



By JOHN RYAN

Page Lister is a powerful, albeit short, programming utility that takes the hassle out of listing Basic programs to the screen for study and debugging. No more will you have to type in LIST <linenumber>-<line number> over and over again to search for bugs. At the touch of a function key, Page Lister brings 24 lines of Basic text to the screen and leaves them there for your perusal and editing. As a bonus, a line highlighting function is available to help eliminate the tedium of scanning for errors. Anyone who's tried to compare data between a magazine listing and the screen or who works with Data statements a lot will love this feature!

Type in Listing 1 and save it to disk before running it. When you want to use Page Lister, load and run it to generate the machine language program in its Data statements; then load the program you plan to work on. With both programs in memory, just tap the restore key to activate the Page Lister features. If you've forgotten to load your other program, a message appears to remind you. Otherwise, the screen goes blank and awaits your next keypress.

Press F1 each time you want to examine a new batch of 24 lines. At the end of the listing, the next F1 will begin recycling at the first line number. To page backward through the listing, press F3. In this case, when it reaches the beginning of the listing, the paging stops; there's no cycling with F3.

F5 activates the highlight bar, the cursor keys move it up and down and another F5 toggles it off. Pressing F7 exits from Page Lister.

This utility works fine with all Basic programs except those with embedded List-protection features and those with machine language programs automatically appended to them by certain assemblers. Ⓡ

John Ryan is an air traffic control instructor and advanced machine language programmer with experience on a number of computer systems, including, of course, the Commodore.

Listing 1. Page Lister program.

```
Ø REM PAGE LISTER - JOHN RYAN
                              :REM*228
1Ø FORT=49152 TO 49848:READ D:P
   OKE T,D:X=X+D:NEXT    :REM*47
2Ø IF X<>8877Ø THEN PRINT "ERRO
   R IN DATA STATEMENTS":END
                              :REM*151
3Ø PRINT"{SHFT CLR} {CTRL 9}PRE
   SS RESTORE TO ACTIVATE PAGE
   LISTER.":SYS 49152:NEW
                              :REM*191
4Ø DATA 12Ø,169,26,141,2,128,16
   9,192,141,3,128,162,Ø,189,17
   9,194,157,4                :REM*132
5Ø DATA 128,232,224,5,2Ø8,245,8
   8,96,1Ø4,168,1Ø4,17Ø,1Ø4,88,
   32,234,255,32              :REM*2Ø
6Ø DATA 225,255,2Ø8,3,76,1Ø2,25
   4,169,1,133,2Ø4,32,171,192,3
   2,99,192,144               :REM*2Ø6
7Ø DATA 1Ø,169,157,16Ø,194,32,3
   Ø,171,76,84,193,169,Ø,141,11
   6,194,141,117              :REM*2Ø2
8Ø DATA 194,141,113,194,169,147
   ,32,21Ø,255,162,Ø,16Ø,1,24,3
   2,24Ø,255,169              :REM*123
9Ø DATA 118,16Ø,194,32,3Ø,171,7
   6,25Ø,192,16Ø,Ø,177,169,24Ø,
   2,24,96,2ØØ                :REM*27
1ØØ DATA 177,169,24Ø,2,24,96,56
   ,96,24,165,155,1Ø5,4Ø,133,1
   55,165,156,1Ø5,Ø           :REM*59
11Ø DATA 133,156,96,56,165,155,
   233,4Ø,133,155,165,156,233,
   Ø,133,156,96,23Ø           :REM*12Ø
12Ø DATA 169,2Ø8,2,23Ø,17Ø,96,1
   62,Ø,169,32,157,Ø,4,157,Ø,5
   ,157,Ø,6,157,Ø,7           :REM*183
13Ø DATA 232,2Ø8,241,96,165,43,
   133,169,165,44,133,17Ø,96,5
   6,165,45,233,3             :REM*4
14Ø DATA 141,167,2,165,46,233,Ø ►
```

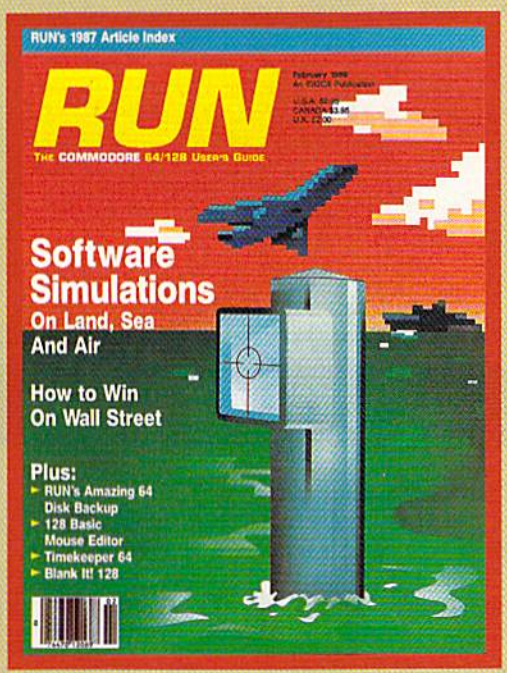
RUN it right: **C-64**

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```
    ,141,168,2,56,165,169,237,1
    67,2,141,169,2        :REM*7Ø
15Ø DATA 165,17Ø,237,168,2,13,1
    69,2,24Ø,4,176,2,24,96,56,9
    6,174,116,194         :REM*28
16Ø DATA 165,169,157,184,194,23
    2,165,17Ø,157,184,194,232,1
    42,116,194,96,24      :REM*29
17Ø DATA 174,114,194,172,115,19
    4,32,24Ø,255,96,32,228,255,
    24Ø,251,2Ø1,133       :REM*51
18Ø DATA 2Ø8,28,32,151,192,32,2
    2Ø,192,173,113,194,24Ø,8,16
    9,Ø,141,113,194       :REM*139
19Ø DATA 141,117,194,32,97,193,
    238,117,194,76,25Ø,192,2Ø1,
    134,2Ø8,45,173        :REM*14
2ØØ DATA 117,194,2Ø1,2,144,2Ø8,
    174,116,194,2Ø2,2Ø2,142,116
    ,194,2Ø2,2Ø2,189      :REM*12Ø
21Ø DATA 184,194,133,169,232,18
    9,184,194,133,17Ø,32,151,19
    2,32,97,193,2Ø6       :REM*184
22Ø DATA 117,194,169,Ø,141,113,
    194,76,25Ø,192,2Ø1,136,2Ø8,
    3,76,123,227,2Ø1      :REM*226
23Ø DATA 135,2Ø8,159,32,19,194,
    76,25Ø,192,162,Ø,142,114,19
    4,16Ø,Ø,14Ø,115       :REM*71
24Ø DATA 194,32,239,192,32,144,
    192,32,144,192,16Ø,Ø,177,16
    9,17Ø,2ØØ,177         :REM*173
25Ø DATA 169,32,2Ø5,189,169,32,
    32,21Ø,255,32,144,192,32,14
    4,192,16Ø,Ø,177       :REM*47
26Ø DATA 169,24Ø,4Ø,16,6,32,22Ø
    ,193,76,178,193,2Ø1,34,2Ø8,
    19,32,21Ø,255,32      :REM*1Ø6
27Ø DATA 144,192,16Ø,Ø,177,169,
    24Ø,16,2Ø1,34,24Ø,3,76,156,
    193,32,21Ø,255        :REM*32
28Ø DATA 32,144,192,76,138,193,
    32,144,192,56,32,24Ø,255,23
    2,142,114,194,32      :REM*1
29Ø DATA 18Ø,192,144,9,32,171,1
    92,169,1,141,113,194,96,173
    ,114,194,2Ø1,23       :REM*177
3ØØ DATA 176,3,76,1Ø7,193,96,56
    ,233,127,17Ø,132,73,16Ø,255
    ,2Ø2,24Ø,8,2ØØ        :REM*22
31Ø DATA 185,158,16Ø,16,25Ø,48,
    245,2ØØ,185,158,16Ø,141,53,
    3,48,5,32,71,171      :REM*156
32Ø DATA 2Ø8,242,173,53,3,2Ø1,1
    63,144,9,2Ø1,18Ø,176,5,233,
    127,76,15,194         :REM*4Ø
33Ø DATA 233,128,32,21Ø,255,96,
    169,Ø,141,112,194,133,155,1
    69,4,133,156,32       :REM*45
34Ø DATA 92,194,32,228,255,24Ø,
    251,2Ø1,135,24Ø,64,2Ø1,17,2
    Ø8,22,173,112         :REM*174
35Ø DATA 194,2Ø1,24,24Ø,236,32,
    92,194,32,116,192,238,112,1
    94,32,92,194,76       :REM*78
36Ø DATA 33,194,2Ø1,145,2Ø8,217
    ,173,112,194,24Ø,212,2Ø6,11
    2,194,32,92,194       :REM*34
37Ø DATA 32,13Ø,192,32,92,194,7
    6,33,194,16Ø,Ø,177,155,73,1
    28,145,155,2ØØ        :REM*68
38Ø DATA 192,4Ø,2Ø8,245,96,32,9
    2,194,76,25Ø,192,Ø,Ø,Ø,Ø,Ø,
    Ø,8Ø,65,71,69,32      :REM*19
39Ø DATA 76,73,83,84,69,82,32,6
    5,67,84,73,86,65,84,69,68,3
    2,79,78,32,7Ø,85      :REM*65
4ØØ DATA 78,67,84,73,79,78,32,7
    5,69,89,83,Ø,78,79,32,8Ø,82
    ,79,71,82,65,77       :REM*184
41Ø DATA 32,73,78,32,77,69,77,7
    9,82,89,33,Ø,195,194,2Ø5,56
    ,48,Ø                 :REM*154
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■

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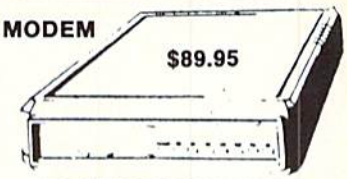
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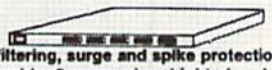
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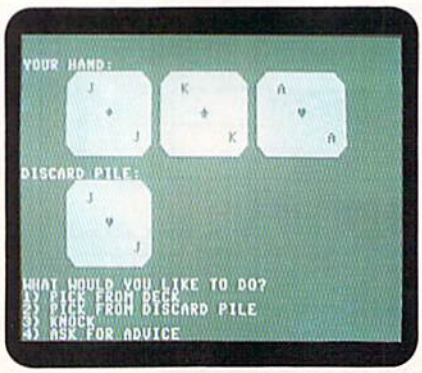
Score 31 and win the pot in this fun-filled card game for your 64 or 128.

By JOHN FEDOR

"I'll bet you a nickel!" Okay, but how about $5? The winnings are up in Cards-31, a Commodore version of the traditional game in which you try to win a "pot" of nickels by getting a total score of 31, or as close to it as possible, with cards of the same suit. Numbered cards are worth their face value, face cards are worth 10, and aces count 11. In this game, a pot of imaginary $5 bills is at stake instead of nickels.

You can play up to four computerized opponents in Cards-31, or just sit out and watch them battle among themselves. The game starts with each player having three cards and $15. A discard pile is established with one card facing up. When it's your turn, you have four options: draw a card from the deck; draw the exposed card from the discard pile; knock (which you do when you're as close to 31 as you figure you can get); or ask your expert opponent (the computer) to look at your cards and offer advice. If you ask for advice, don't worry—the machine won't remember your hand when playing its own.

If you draw from either the deck or the discard pile, you must discard to keep only three cards in your hand. In general, drop a card that's not of the same suit as two others in your hand or that's of less value than the others. For instance, if you hold a jack and queen of spades and a king of diamonds and then draw a 9 of spades, drop the king of diamonds. If you hold a 7, jack and king of hearts and draw a 10 of hearts, drop the 7.



Play against up to four computerized opponents in Cards-31.

You can choose to knock when you feel you've reached the best score you're going to get, or when you chance to get a fair score early in the round and judge that your opponents may not yet have collected much in one suit. After someone knocks, each of the other players gets one more turn to better his hand. This ends the round, and the scores are computed and displayed with the final hands.

Only the cards in the suit each player holds the most of count in the scores of each round. For example, if you hold a 9 and 4 of hearts and a 10 of clubs, your score is 13 (9 + 4). If your cards are all in different suits, only the card with the highest value is counted. The maximum you can get for your three cards is the magic 31 (the ace plus two face cards or one face card and the 10, all in the same suit).

As a round ends, each player whose score is less than the best loses $5 to the pot, and the amount in the pot is displayed, as well as the amount each player has remaining. The next round starts with the player after the one who knocked last. When you're out of money, you're out of the game, which continues until only one player has any money left—and he wins the pot!

You'll find your computerized opponents the most skillful players this side of Las Vegas, and each has different instructions for when to knock. With the variety of play options available and the strategy involved, this version of 31 should keep you entertained for hours. R

John Fedor is a college student who especially enjoys mathematics and working with his computer.

Listing 1. Cards-31 program.

```
Ø REM CARDS 31 - JOHN FEDOR
                          :REM*134
1Ø CLR:DIM P$(5),D(52),H(5,4),Q
   (3),C$(13),S$(4),CA(5),MO(5)
   ,SC(4),T(4),TE(5)    :REM*211
2Ø POKE5328Ø,11:POKE53281,12
                          :REM*53
3Ø PRINT"{SHFT CLR}{CTRL 2}{3 C
   RSR DNs}CARDS-31"     :REM*1Ø9
4Ø PRINT"{2 CRSR DNs}PROGRAMMED
    BY JOHN FEDOR"       :REM*251
5Ø PRINT"{2 CRSR DNs}HOW MANY O
   PPONENTS WOULD YOU LIKE (1-4
   )?"                   :REM*19Ø
6Ø PRINT"{CRSR DN}(PRESS <D> IF
    YOU WOULD LIKE TO WATCH.)"
                          :REM*2
7Ø POKE198,Ø:PL$="D":P$(1)="OBS
   ERVER"                :REM*241
8Ø GETA$:IF(A$<"1"ORA$>"4")ANDA
   $<>"D"THEN8Ø          :REM*118
9Ø IFA$="D"THENOP=5:MO(1)=Ø:GOT
   O15Ø                  :REM*1ØØ
1ØØ PRINT"{SHFT CLR}{2 CRSR DNs
    }YOU WILL PLAY AGAINST "A$"
    OPPONENT";:OP=VAL(A$)+1:PL
    $=""                 :REM*13Ø
11Ø A$="S.":IFOP=2THENA$="."
                          :REM*136
12Ø PRINTA$               :REM*254 ►
```

RUN it right: **C-64; C-128**

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KNOCK!

```
13Ø PRINT"{2 CRSR DNs}WHAT SHAL
    L I CALL YOU ";      :REM*75
14Ø INPUTP$(1):P$(1)=LEFT$(P$(1
    ),12):FORI=1TO5:MO(I)=Ø:NEX
    TI:MO(1)=15:CA(1)=27
                         :REM*172
15Ø FORI=2TO OP:MO(I)=15
                         :REM*174
16Ø READP$(I),CA(I):IFP$(I)=P$(
    1)THEN16Ø            :REM*135
17Ø NEXTI:TU=Ø           :REM*235
18Ø DATA FRED,3Ø,TED,29,ALFRED,
    28,ERNEST,27,BERTRAM,25
                         :REM*32
19Ø REM START AGAIN HERE:REM*74
2ØØ PRINT"{SHFT CLR}{2 CRSR DNs
    }THE PLAYERS ARE:{CRSR DN}"
    :KN=Ø                :REM*96
21Ø FORI=1TOOP:PRINTP$(I)TAB(15
    )"$"MO(I):NEXT       :REM*13Ø
22Ø PRINT"{CRSR DN}POT:"TAB(15)
    "$";                 :REM*147
23Ø M=OP*15:FORI=1TOOP:M=M-MO(I
    ):NEXTI:IFP$(1)="OBSERVER"T
    HENM=M-15            :REM*215
24Ø PRINTM               :REM*33
25Ø PRINT"{2 CRSR DNs}SHUFFLING
     DECK.....................
    ...";                :REM*251
26Ø FORY=ØTO3:FORX=1TO13:D(Y*13
    +X)=Y*1ØØ+X:NEXTX:PRINT"{CR
    SR LF} {CRSR LF}";:NEXTY
                         :REM*1Ø6
27Ø FORX=1TO21:FORY=1TO7
                         :REM*194
28Ø Z1=INT(RND(1)*52)+1:Z2=INT(
    RND(1)*52)+1         :REM*54
29Ø Z3=D(Z1):D(Z1)=D(Z2):D(Z2)=
    Z3                   :REM*245
3ØØ NEXTY:PRINT"{CRSR LF} {CRSR
     LF}";:NEXTX:PRINT   :REM*111
31Ø PRINT"{CRSR DN}DEALING..."
                         :REM*113
32Ø DP=1:REM DECK POINTER
                         :REM*162
33Ø FORI=1TO 3           :REM*148
34Ø FORZ=1TO OP          :REM*173
35Ø IF MO(Z)=ØTHEN37Ø    :REM*185
36Ø H(Z,I)=D(DP):DP=DP+1
                         :REM*22Ø
37Ø NEXTZ,I              :REM*84
38Ø DI=D(DP):DP=DP+1:REM DISCAR
    D PILE               :REM*117
39Ø FORI=1TO3:Q(I)=H(1,I):NEXT:
    REM FOR PRINT ROUTINE
                         :REM*218
4ØØ TU=TU+1:IFTU>OPTHENTU=1
                         :REM*7Ø
41Ø IF DP>52THENPRINT"{SHFT CLR
    }{2 CRSR DNs}NO MORE CARDS
    IN THE DECK.":GOTO99Ø
                         :REM*67
42Ø IF KN<>Ø THEN KN=KN-1:IF KN
    =Ø THENPRINT"{SHFT CLR}{2 C
    RSR DNs}LAST ROUND COMPLETE
    D.":GOTO99Ø          :REM*46
43Ø IF MO(TU)=ØTHEN39Ø   :REM*42
44Ø PRINT"{SHFT CLR}{2 CRSR DNs
    }YOUR HAND:"         :REM*1Ø7
45Ø IF MO(1)=Ø THENPRINT"{3 CRS
    R DNs}"TAB(13)"{CTRL 9}NOT
    AVAILABLE{4 CRSR UPs}":GOTO
    47Ø                  :REM*185
46Ø GOSUB{2 SPACEs}13ØØ  :REM*1
47Ø PRINT"{7 CRSR DNs}":PRINT"D
    ISCARD PILE:":Q(1)=DI:Q(2)=
    Ø:Q(3)=Ø:GOSUB13ØØ   :REM*11Ø
48Ø IFTU>1THEN83Ø        :REM*149
49Ø PRINT"{8 CRSR DNs}WHAT WOUL
    D YOU LIKE TO DO?"   :REM*132
5ØØ PRINT"1) PICK FROM DECK"
                         :REM*12
51Ø PRINT"2) PICK FROM DISCARD
    PILE"                :REM*33
52Ø PRINT"3) KNOCK"      :REM*2Ø4
53Ø PRINT"4) ASK FOR ADVICE";:P
    OKE198,Ø             :REM*1Ø7
54Ø GETA$:IFA$<"1"ORA$>"4"THEN5
    4Ø                   :REM*243
55Ø IFA$="3"ANDKN<>ØTHEN54Ø
                         :REM*75
56Ø IFA$="3"THEN KN=OP:PRINT"{H
    OME}KNOCKING...";:FORI=1TO5
    ØØØ:NEXT:GOTO39Ø     :REM*15Ø
57Ø IFA$="4"THEN68Ø      :REM*189
58Ø IFA$="1"THENDI=D(DP):DP=DP+
    1                    :REM*51
59Ø PRINT"{SHFT CLR}{CRSR DN}"T
    AB(8)"(1)"TAB(18)"(2)"TAB(2
    8)"(3)"              :REM*76
6ØØ FORI=1TO3:Q(I)=H(1,I):NEXT:
    GOSUB13ØØ            :REM*15
61Ø PRINT"{8 CRSR DNs}"TAB(18)"
    (4)"                 :REM*193
62Ø Q(1)=Ø:Q(2)=DI:Q(3)=Ø:GOSUB
    13ØØ                 :REM*2Ø4
63Ø PRINT"{1Ø CRSR DNs}WHICH ON
    E WOULD YOU LIKE TO DISCARD
    ?"                   :REM*194
64Ø POKE198,Ø             :REM*7
65Ø GETA$:IFA$<"1"ORA$>"4"THEN6
    5Ø                   :REM*27
66Ø IFA$<>"4"THENA=DI:DI=H(1,VA
    L(A$)):H(1,VAL(A$))=A
                         :REM*85
67Ø GOTO39Ø              :REM*252
68Ø REM GIVE ADVICE      :REM*156
69Ø K1=31-OP*2-2*(I=4)-4*(I=5)
                         :REM*155
7ØØ REM CHECK TO SEE FOR DISCAR
    D                    :REM*196
71Ø H(1,4)=DI            :REM*58
72Ø FORI=1TO4:SC(I)=H(1,I):NEXT
                         :REM*186
73Ø GOSUB148Ø            :REM*51
74Ø IFDR=4THEN76Ø        :REM*149
75Ø PRINT"{SHFT CLR}{2 CRSR DNs
    }IF I WERE YOU, I WOULD PIC
    K UP FROM THE DISCARD PILE.
    ":GOTO79Ø            :REM*44
76Ø IF KN<>ØTHEN78Ø      :REM*147
77Ø IFSC>=K1THENPRINT"{SHFT CLR
    }{2 CRSR DNs}IT WOULD SEEM
    LOGICAL TO KNOCK AT THIS{2
    SPACEs}TIME.":GOTO79Ø
                         :REM*48
78Ø PRINT"{SHFT CLR}{2 CRSR DNs
    }YOU MIGHT AS WELL TAKE A C
    HANCE AND PICKA CARD FROM T
    HE DECK."            :REM*85
79Ø PRINT"{3 CRSR DNs}PRESS <RE
    TURN> TO CONTINUE.":REM*186
8ØØ POKE198,Ø            :REM*167
81Ø GETA$:IFA$<>CHR$(13)THEN81Ø
                         :REM*15
82Ø TU=TU-1:GOTO39Ø      :REM*247
83Ø REM{2 SPACEs}COMPUTER'S TUR
    N                    :REM*153
84Ø K1=CA(TU)            :REM*19Ø
85Ø H(TU,4)=DI           :REM*47
86Ø FORI=1TO4:SC(I)=H(TU,I):NEX
    T                    :REM*247
87Ø GOSUB148Ø:PRINT"{HOME}";
                         :REM*245
88Ø IFDR=4 THEN 92Ø      :REM*239
89Ø IFDI-INT(DI/1ØØ)*1ØØ<2 AND
    KN=Ø THEN95Ø         :REM*92
9ØØ A$=P$(TU)+" IS PICKING FROM
     THE DISCARD PILE.":GOSUB16
    5Ø                   :REM*144
91Ø DI=H(TU,DR):H(TU,DR)=H(TU,4
    ):FORI=1TO1ØØØ:NEXTI:GOTO39
    Ø                    :REM*26
92Ø IF SC<K1 OR KN<>Ø THEN 95Ø
                         :REM*89
93Ø A$=P$(TU)+" IS KNOCKING.":G
    OSUB165Ø             :REM*255
94Ø KN=OP:FORI=1TO1ØØØ:NEXTI:GO
    TO39Ø                :REM*152
95Ø A$=P$(TU)+" PICKS A CARD FR
    OM THE DECK.":GOSUB165Ø
                         :REM*13
96Ø H(TU,4)=D(DP):DP=DP+1
                         :REM*79
97Ø FORI=1TO4:SC(I)=H(TU,I):NEX
    T                    :REM*1Ø4
98Ø GOSUB148Ø:DI=H(TU,DR):H(TU,
    DR)=H(TU,4):FORI=1TO1ØØØ:NE
    XTI:GOTO39Ø          :REM*225
99Ø REM ROUND OVER       :REM*254
1ØØØ PRINT"{2 CRSR DNs}":FORI4=
    1TOOP:GOSUB171Ø:NEXTI4
                         :REM*66
1Ø1Ø X=Ø:SC=Ø:FORI=1TOOP:IFTE(I
    )>SCTHENSC=TE(I)     :REM*97
1Ø2Ø NEXTI               :REM*21
1Ø3Ø FORI=1TOOP:IFTE(I)=SCTHENX
    =X+1                 :REM*2
1Ø4Ø NEXTI:A$=" IS":IFX>1THENA$
    ="S ARE"             :REM*22Ø
1Ø5Ø PRINT"{CRSR DN}THE WINNER"
    A$": ";              :REM*16Ø
1Ø6Ø FORI=1TOOP:IFTE(I)=SCTHENP
    RINTP$(I)",";        :REM*1Ø1
1Ø7Ø IF TE(I)<SCTHENMO(I)=MO(I)
    -5:IFMO(I)<ØTHENMO(I)=Ø
                         :REM*17
1Ø8Ø NEXTI:PRINT"{CRSR LF}."
                         :REM*7
1Ø9Ø PRINT"{CRSR DN}PRESS <RETU
    RN> TO CONTINUE."    :REM*6
11ØØ POKE198,Ø           :REM*196
111Ø GETA$:IFA$<>CHR$(13)THEN11
    1Ø                   :REM*173
112Ø X=Ø:FORI=1TOOP:IFMO(I)<>ØT
    HENX=X+1             :REM*254
113Ø NEXTI:IFX>1THEN119Ø :REM*6
```

KNOCK!

```
114Ø PRINT"{SHFT CLR}{2 CRSR DN
     s}THE WINNER IS: ";
                          :REM*175
115Ø FORI=1TOOP:IFMO(I)<>ØTHENP
     RINTP$(I)            :REM*28
116Ø NEXTI:PRINT"{2 CRSR DNs}TH
     E WINNING POT IS $";:M=OP*
     15:FORI=1TOOP:M=M-MO(I):NE
     XT                   :REM*185
117Ø IFP$(1)="OBSERVER"THENM=M-
     15                   :REM*184
118Ø PRINTM:GOTO126Ø      :REM*177
119Ø IF MO(1)<>Ø THEN 2ØØ
                          :REM*158
12ØØ IFPL$="D"THEN2ØØ     :REM*19Ø
121Ø PRINT"{SHFT CLR}{2 CRSR DN
     s}YOU ARE OUT OF THE GAME.
     "                    :REM*3
122Ø PRINT"{CRSR DN}WOULD YOU L
     IKE TO WATCH THE OTHERS PL
     AY?"                 :REM*176
123Ø POKE198,Ø            :REM*71
124Ø GETA$:IFA$<>"Y"ANDA$<>"N"T
     HEN124Ø              :REM*12
125Ø IFA$="Y"THENPL$="D":GOTO2Ø
     Ø                    :REM*242
126Ø PRINT"{CRSR DN}PRESS <RETU
     RN> TO RESTART."     :REM*23Ø
127Ø POKE198,Ø            :REM*127
128Ø GETA$:IFA$<>CHR$(13)THEN12
     8Ø                   :REM*139
129Ø RUN                  :REM*145
13ØØ REM PRINT OUT CARD(S)
                          :REM*219
131Ø FORI=1TO3:A=Q(I):S=INT(A/1
     ØØ):F=A-S*1ØØ:S=S+1
                          :REM*227
132Ø IFQ(I)=ØTHEN146Ø     :REM*222
133Ø S$(1)="{SHFT A}":S$(2)="{S
     HFT S}":S$(3)="{SHFT Z}":S
     $(4)="{SHFT X}"      :REM*15
134Ø C$(1)="2":C$(2)="3":C$(3)=
     "4":C$(4)="5":C$(5)="6":C$
     (6)="7":C$(7)="8"    :REM*221
135Ø C$(8)="9":C$(9)="1Ø":C$(1Ø
     )="J":C$(11)="Q":C$(12)="K
     ":C$(13)="A"         :REM*254
136Ø S$=S$(S):C$=C$(F)    :REM*241
137Ø IFLEN(C$)<2THENC$=" "+C$
                          :REM*184
138Ø PRINTTAB((I-1)*1Ø+5)"{CTRL
      9}{SHFT LB.}{7 SPACEs}{CO
     MD *}{CTRL Ø}"       :REM*131
139Ø PRINTTAB((I-1)*1Ø+5)"{CTRL
      9} "C$"{6 SPACEs}{CTRL Ø}
     "                    :REM*8
14ØØ PRINTTAB((I-1)*1Ø+5)"{CTRL
      9}{9 SPACEs}{CTRL Ø}"
                          :REM*2Ø1
141Ø PRINTTAB((I-1)*1Ø+5)"{CTRL
      9}{4 SPACEs}"S$"{4 SPACEs
     }{CTRL Ø}"           :REM*21
142Ø PRINTTAB((I-1)*1Ø+5)"{CTRL
      9}{9 SPACEs}{CTRL Ø}"
                          :REM*213
143Ø PRINTTAB((I-1)*1Ø+5)"{CTRL
      9}{6 SPACEs}"C$" {CTRL Ø}
     "                    :REM*1Ø
144Ø PRINTTAB((I-1)*1Ø+5)"{COMD
     *}{CTRL 9}{7 SPACEs}{CTRL
     Ø}{SHFT LB.}"        :REM*167
145Ø PRINT"{8 CRSR UPs}":REM*84
146Ø NEXTI                :REM*2Ø6
147Ø RETURN               :REM*74
148Ø REM SCORE THE HAND (SC(1)-
     SC(4))               :REM*81
149Ø REM RETURN SC=BEST SCORE
                          :REM*126
15ØØ REM{8 SPACEs}DR=WORST CARD
                          :REM*2Ø1
151Ø FORI=1TO4:IFSC(I)=ØTHENSC(
     I)=5ØØ               :REM*7
152Ø NEXTI                :REM*3
153Ø DR=1:SC=Ø:FORI=1TO4:REM I
     IS THE CARD NOT TO BE INCL
     UDED DURING SEARCH :REM*17
154Ø FORX=1TO4:T(X)=Ø:NEXTX
                          :REM*1Ø6
155Ø FORX=1TO4:IFX=ITHEN159Ø
                          :REM*5
156Ø A=SC(X):B=INT(A/1ØØ):C=1+A
     -B*1ØØ:B=B+1:IFC>1ØTHENC=1
     Ø-(C=14)             :REM*184
157Ø IFB>4THEN159Ø        :REM*123
158Ø T(B)=T(B)+C          :REM*2Ø9
159Ø NEXTX:Q=Ø:FORX=1TO4:IFT(X)
     >QTHENQ=T(X)         :REM*2ØØ
16ØØ NEXTX:IFQ>SCTHENSC=Q:DR=I:
     GOTO164Ø             :REM*128
161Ø IFQ<SCTHEN164Ø       :REM*198
162Ø IFI=4THENDR=I:GOTO164Ø
                          :REM*7Ø
163Ø IFSC(DR)-INT(SC(DR)/1ØØ)*1
     ØØ>SC(I)-INT(SC(I)/1ØØ)*1Ø
     ØTHENDR=I            :REM*1Ø3
164Ø NEXTI:RETURN         :REM*1Ø4
165Ø REM PRINT OUT A$-> NO WRAP
      AROUND              :REM*17Ø
166Ø X=Ø:PRINT"{CTRL 9}";
                          :REM*11
167Ø FORI=1TOLEN(A$):IFMID$(A$,
     I,1)<>" "THENNEXTI:I=LEN(A
     $)                   :REM*117
168Ø IFX+I>38THENPRINT:PRINT"{C
     TRL 9}";:X=Ø         :REM*174
169Ø X=X+I:PRINTLEFT$(A$,I);:A$
     =RIGHT$(A$,LEN(A$)-I):IFA$
     <>""THEN167Ø         :REM*236
17ØØ PRINT:RETURN         :REM*82
171Ø REM PRINT OUT NAME,CARDS,S
     CORE                 :REM*31
172Ø PRINTP$(I4);:IFI4=TUTHENPR
     INT" (KNOCKED)";     :REM*5Ø
173Ø PRINTTAB(23):IF MO(I4)=ØTH
     ENPRINT"OUT OF PLAY"TAB(36
     ):SC=Ø:GOTO177Ø      :REM*235
174Ø FORX=1TO3:A=H(I4,X):S=INT(
     A/1ØØ):F=A-S*1ØØ:S=S+1
                          :REM*219
175Ø PRINTC$(F)S$(S)"{2 SPACEs}
     ";:NEXTX:PRINTTAB(36)
                          :REM*1Ø8
176Ø FORI=1TO3:SC(I)=H(I4,I):NE
     XTI:SC(4)=Ø:GOSUB148Ø
                          :REM*155
177Ø PRINTSC"{3 SPACEs}":TE(I4)
     =SC:RETURN           :REM*226
```

■

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Vacation Checklist Generator

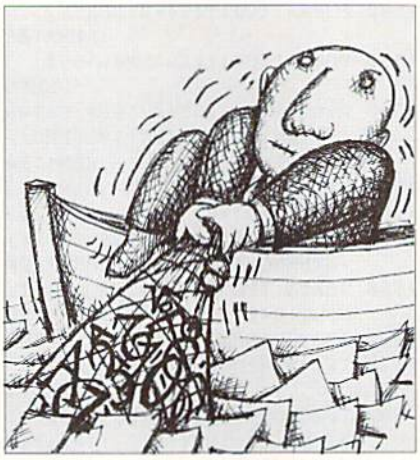
Never again need you be troubled by the nagging uncertainty that you've left a crucial item behind.

Program by Lou Wallace; Article by Tim Walsh

How do you spend your well-deserved vacations? Whether you bask in the tropical sun of Antigua, stalk wild boar in the Maine Alagash or just pitch a couple of tents in the local swamp for a Saturday night of mosquito-slapping, you could use Vacation Checklist Generator.

As its name implies, Vacation Checklist Generator allows you to produce a list of the items you're going to take on your trip. Many camping items are included on the list and automatically appear when the program is run. You simply need to answer Y or N at the prompts to add or skip an item on your list of equipment. Once it's completed to your satisfaction, you can print it out.

When packing your car or suitcases, you check off each item against your printed list. Not only are these lists invaluable for packing when you leave



home, but also for checking to see you haven't forgotten anything when you're leaving your campsite. This reduces the risk of not-so-funny whines on the ride home, such as, "Dad, I think we left the tackle box behind." You can reassure yourself and your offspring by showing that you checked off the tackle box beforehand.

As written, the program's camping gear list was formed with the no-holds-barred camper in mind. Few vacationers have a need for a shotgun, hunting knife and camouflage when traveling to Disneyland, so the program permits you to skip any or all of the default camping equipment and create your own customized list by substituting items.

As a notoriously ill-prepared camper, I view this program as the ultimate camping accessory. Never again will you accidentally leave anything behind, except, hopefully, your worries. R

Lou Wallace and Tim Walsh together form RUN*'s formidable technical team.*

Listing 1. Vacation Checklist program.

```
10 REM VACATION CHECKLIST GENER
   ATOR                    :REM*212
20 REM RUN MAGAZINE        :REM*15
30 REM EASY APPLICATIONS SEPTEM
   BER 1988                :REM*244
40 REM LOU WALLACE         :REM*8
50 PRINT CHR$(14):POKE 53280,0:
   POKE 53281,0            :REM*60
60 IF ((ABS(PEEK(65533)=255))=0
   ) THEN POKE 650,128     :REM*65
70 DIM IT$(255),VA$(20,20),CA(2
   0),CA$(20),DC$(20),DC(20)
                           :REM*58
80 FOR I=0 TO 78:DT$=DT$+".":NE
   XT                      :REM*218
90 FOR I=1 TO 40:SP$=SP$+" ":NE
   XT                      :REM*8
100 RT$=CHR$(20):V=54273
                           :REM*103
110 READ N                 :REM*144
120 FORI=1 TO N:READ CA$(I):REA
    D CA(I):FOR J=1 TO CA(I):RE
    AD VA$(I,J):NEXT:NEXT
                           :REM*177
130 PRINT"{SHFT CLR}";     :REM*195
140 PRINT"{CTRL 2}{SHFT V}ACATI
    ON {SHFT C}HECKLIST {SHFT G
    }ENERATOR"             :REM*138
150 PRINT                  :REM*46
160 PRINT "{SHFT H}ERE IS A LIS
    T OF ITEMS YOU MIGHT"
                           :REM*72
170 PRINT "{2 SPACEs}WANT TO BE
     ON YOUR CHECKLIST."
                           :REM*227
180 PRINT:PRINT"{SHFT E}NTER {S
    HFT Y} FOR YES IF YOU WANT
    AN ITEM,"              :REM*213
190 PRINT"{2 SPACEs}OR {SHFT N}
     FOR NO IF YOU DON'T."
                           :REM*81
200 PRINT:PRINT"{SHFT Y}OU WILL
     BE GIVEN A CHANCE TO ADD"
                           :REM*135
210 PRINT"{2 SPACEs}YOUR OWN IT
    EMS AT THE END."       :REM*173
220 PRINT:PRINT:DC(0)=0:CT=0
                           :REM*152
230 FOR I=1 TO N:DC=0      :REM*232
240 PRINT "{CTRL 2}{SHFT T}HIS
    CATEGORY IS {COMD 3}";CA$(I
    ):PRINT:GOSUB 890      :REM*81
250 FOR J=1 TO CA(I)       :REM*241
260 PRINT "{COMD 6}";VA$(I,J)
                           :REM*236
270 GOSUB 800              :REM*88
280 IF KE$="N" THEN 310    :REM*95
290 IT$(CT)=VA$(I,J):CT=CT+1
                           :REM*61
300 DC=DC+1                :REM*181
310 NEXT:IF DC>0 THEN NC=NC+1:D
    C(NC)=DC:DC$(NC)=CA$(I)
                           :REM*42 ►
```

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32Ø NEXT                    :REM*195
33Ø PRINT:PRINT"{CTRL 2}{SHFT H
    }ERE IS WHAT YOU ENTERED SO
     FAR{COMD 3)":PRINT:REM*22Ø
34Ø IF NC=Ø THEN PRINT:PRINT "{
    SHFT Y}OU'VE ENTERED NOTHIN
    G SO FAR!":CT=Ø:GOTO 41Ø
                            :REM*11
35Ø CT=Ø:FOR I=1 TO NC:PRINT "{
    CTRL 2}";DC$(I):FOR J=1 TO
    DC(I)                   :REM*212
36Ø PRINT "{COMD 6}";IT$(CT):CT
    =CT+1:NEXT:PRINT        :REM*9
37Ø FOR TT=1 TO 5Ø:GET TT$:NEXT
                            :REM*183
38Ø PRINT:PRINT "{CTRL 6}{SHFT
    P}RESS ANY KEY TO CONTINUE.
    "                       :REM*133
39Ø GET A$:IF A$="" THEN 39Ø
                            :REM*66
4ØØ PRINT:NEXT              :REM*39
41Ø PRINT:PRINT"{CTRL 2}{SHFT W
    }OULD YOU LIKE TO ADD SOME
    OF YOUR OWN? ({COMD 6}Y{CTR
    L 2}/{COMD 7}N{CTRL 2})"
                            :REM*64
42Ø GOSUB 86Ø               :REM*7
43Ø IF KE$="N" THEN 54Ø     :REM*11
44Ø NC=NC+1:DC$(NC)="{SHFT C}{S
    HFT U}{SHFT S}{SHFT T}{SHFT
     O}{SHFT M}":DC=1       :REM*84
45Ø PRINT:INPUT"{CTRL 2}{SHFT W
    }HAT WOULD YOU LIKE TO ADD{
    COMD 6}";AD$            :REM*145
46Ø PRINT"{CTRL 2}{SHFT Y}OU EN
    TERED {COMD 6}";AD$;"."
                            :REM*35
47Ø PRINT"{CTRL 2}{SHFT I}S THA
    T CORRECT? ({COMD 6}Y{CTRL
    2}/{COMD 7}N{CTRL 2})"
                            :REM*234
48Ø GOSUB 86Ø               :REM*59
49Ø IF KE$="Y" THEN IT$(CT)=AD$
    :CT=CT+1:DC=DC+1:GOTO 51Ø
                            :REM*14Ø
5ØØ PRINT "{COMD 6}{SHFT O}KAY,
     LET'S FORGET THAT ONE!{CTR
    L 2}":PRINT             :REM*2Ø8
51Ø PRINT:PRINT"{CTRL 2}{SHFT A
    }DD MORE? ({COMD 6}Y{CTRL 2
    }/{COMD 7}N{CTRL 2})":GOSUB
     89Ø:GOSUB 86Ø          :REM*14
52Ø IF KE$="Y" THEN 45Ø:REM*163
53Ø DC(NC)=DC-1             :REM*235
54Ø IF NC=Ø THEN PRINT"{SHFT H}
    EY, NO REASON TO WASTE PAPE
    R. {SHFT B}YE!":END :REM*54
55Ø PRINT:PRINT"{CTRL 4}{SHFT O
    }KAY, THEN {SHFT I}'LL MAKE
     THE CHECKLIST.{CTRL 2}":PR
    INT                     :REM*228
56Ø REM PRINT STUFF HERE
                            :REM*218
57Ø OPEN 4,4,7:CT=Ø         :REM*119
58Ø PRINT#4,"{23 SPACEs}{SHFT Y
    }{SHFT O}{SHFT U}{SHFT R} {
    SHFT C}{SHFT U}{SHFT S}{SHF
    T T}{SHFT O}{SHFT M}{SHFT I
    }{SHFT Z}{SHFT E}{SHFT D} {
    SHFT V}{SHFT A}{SHFT C}{SHF
    T A}{SHFT T}{SHFT I}{SHFT O
    }{SHFT N} {SHFT C}{SHFT H}{
    SHFT E}{SHFT C}{SHFT K}{SHF
    T L}{SHFT I}{SHFT S}{SHFT T
    }"                      :REM*1Ø7
59Ø PRINT"{SHFT Y}OUR {SHFT C}U
    STOMIZED {SHFT V}ACATION {S
    HFT C}HECKLIST"         :REM*13Ø
6ØØ PRINT#4,RT$:PRINT#4,"{SHFT
    I}{SHFT T}{SHFT E}{SHFT M}{
    SHFT S}{25 SPACEs}{SHFT C}{
    SHFT O}{2 SHFT Ms}{SHFT E}{
    SHFT N}{SHFT T}{SHFT S}"
                            :REM*7
61Ø PRINT "{COMD 3}{SHFT I}TEMS
    "                       :REM*93
62Ø PRINT#4,RT$             :REM*179
63Ø FOR I=1 TO NC           :REM*77
64Ø PRINT "{CTRL 2}";DC$(I):PRI
    NT#4,DC$(I):PRINT#4,RT$
                            :REM*218
65Ø FOR J=1 TO DC(I)        :REM*151
66Ø OU$="{5 SPACEs}"+IT$(CT)+SP
    $                       :REM*21
67Ø OU$=LEFT$(OU$,3Ø)       :REM*239
68Ø OU$=OU$+DT$             :REM*245
69Ø OU$=LEFT$(OU$,79)       :REM*184
7ØØ PRINT#4,OU$             :REM*25Ø
71Ø PRINT#4,RT$              :REM*6
72Ø PRINT "{COMD 6}";IT$(CT)
                            :REM*194
73Ø CT=CT+1                 :REM*211
74Ø NEXT:NEXT               :REM*1Ø1
75Ø PRINT#4,RT$             :REM*62
76Ø PRINT#4,"{23 SPACEs}{SHFT H
    }{SHFT A}{SHFT V}{SHFT E}{S
    HFT SPACE}{SHFT A}{SHFT SPA
    CE}{SHFT G}{2 SHFT Os}{SHFT
     D}{SHFT SPACE}{SHFT T}{SHF
    T I}{SHFT M}{SHFT E}{SHFT S
    PACE}{SHFT O}{SHFT N}{SHFT
    SPACE}{SHFT Y}{SHFT O}{SHFT
     U}{SHFT R}{SHFT SPACE}{SHF
    T V}{SHFT A}{SHFT C}{SHFT A
    }{SHFT T}{SHFT I}{SHFT O}{S
    HFT N}!"                :REM*148
77Ø PRINT#4,CHR$(12)        :REM*58
78Ø PRINT#4:CLOSE4          :REM*54
79Ø END                     :REM*149
8ØØ PRINT"{CTRL 4}ADD THIS TO Y
    OUR LIST? ({COMD 6}Y{CTRL 2
    }/{COMD 7}N{CTRL 2})"
                            :REM*213
81Ø GET KE$:IF KE$="" THEN 81Ø
                            :REM*34
82Ø IF KE$<>"Y" AND KE$<>"N" TH
    EN GOSUB 92Ø:GOTO 81Ø
                            :REM*95
83Ø IF KE$="Y" THEN PRINT"{CTRL
     8}{SHFT Y}{SHFT E}{SHFT S}
    , YOU SELECTED {CTRL 2}";VA
    $(I,J);"{CTRL 8}.":PRINT:GO
    TO 85Ø                  :REM*4
84Ø PRINT "{CTRL 5}{SHFT N}{SHF
    T O}, {SHFT I} DON'T WANT A
    NY {CTRL 2}";VA$(I,J);"{CTR
    L 5}.":PRINT            :REM*238
85Ø RETURN                  :REM*227
86Ø GET KE$:IF KE$="" THEN 86Ø
                            :REM*173
87Ø IF KE$<>"Y" AND KE$<>"N" TH
    EN GOSUB 92Ø:GOTO 86Ø
                            :REM*21
88Ø RETURN                  :REM*253
89Ø REM SOUND ROUTINES HERE
                            :REM*133
9ØØ FORS=ØTO1Ø:POKEV+23,15:POKE
    V+4,9:POKEV+5,Ø:POKEV,S:POK
    EV+3,32:POKEV+3,33      :REM*68
91Ø NEXT:RETURN             :REM*4Ø
92Ø FORS=ØTO1Ø:POKEV+23,15:POKE
    V+4,9:POKEV+5,Ø:POKEV,S:POK
    EV+3,32:POKEV+3,93      :REM*154
93Ø NEXT:RETURN             :REM*68
94Ø REM DATA                :REM*19
95Ø DATA 8                  :REM*173
96Ø DATA "{SHFT S}{SHFT H}{SHFT
     E}{SHFT L}{SHFT T}{SHFT E}
    {SHFT R}",6             :REM*252
97Ø DATA TENT,POLES,STAKES,CANO
    PY,TARP,WHISK BROOM:REM*143
98Ø DATA "{SHFT C}{SHFT L}{SHFT
     O}{SHFT T}{SHFT H}{SHFT I}
    {SHFT N}{SHFT G}",8     :REM*13
99Ø DATA RAIN GEAR,EXTRA SHOES,
    BOOTS,SOCKS,SWEATER,JACKET,
    BATHING SUIT,HAT        :REM*189
1ØØØ DATA "{SHFT S}{SHFT L}{2 S
     HFT Es}{SHFT P}{SHFT I}{SH
     FT N}{SHFT G}",3       :REM*219
1Ø1Ø DATA SLEEPING BAG(S),PILLO
     W,SLEEPING PAD         :REM*148
1Ø2Ø DATA "{SHFT C}{2 SHFT Os}{
     SHFT K}{SHFT I}{SHFT N}{SH
     FT G}",8               :REM*24Ø
1Ø3Ø DATA STOVE,FUEL,MATCHES,UT
     ENSILS,POTS & PANS,CUPS,TA
     BLE CLOTH,FOOD         :REM*18Ø
1Ø4Ø DATA "{SHFT E}{2 SHFT Ss}{
     SHFT E}{SHFT N}{SHFT T}{SH
     FT I}{SHFT A}{SHFT L}{SHFT
      S}",6                 :REM*72
1Ø5Ø DATA KNIFE,MAPS,WATER CANT
     EENS,FLASHLIGHT,LANTERN,BA
     TTERIES                :REM*165
1Ø6Ø DATA "{SHFT F}{SHFT I}{SHF
     T S}{SHFT H}{SHFT I}{SHFT
     N}{SHFT G}",5          :REM*249
1Ø7Ø DATA FISHING POLE,TACKLE B
     OX,WORMS,SHINERS,WADING BO
     OTS                    :REM*11
1Ø8Ø DATA "{SHFT H}{SHFT U}{SHF
     T N}{SHFT T}{SHFT I}{SHFT
     N}{SHFT G}",8          :REM*67
1Ø9Ø DATA SHOTGUN,RIFLE,BOW,AMM
     O,ARROWS,HUNTING KNIFE,CAM
     OUFLAGE,DECOYS         :REM*94
11ØØ DATA "{SHFT M}{SHFT I}{SHF
     T S}{SHFT C}{SHFT E}{2 SHF
     T Ls}{SHFT A}{SHFT N}{SHFT
      E}{SHFT O}{SHFT U}{SHFT S
     }",1Ø                  :REM*28
111Ø DATA BACK PACK,SUNGLASSES,
     SUN SCREEN,INSECT REPELLEN
     T,FIRST AID KIT        :REM*7
112Ø DATA CAMERA,FILM,BINOCULAR
     S,TOWELS,AXE           :REM*2ØØ■
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TELECOMPUTING WORKSHOP

Everything you always wanted to know about modems and weren't afraid to ask!

By LOREN LOVHAUG

IF YOU ARE A LONG-TIME Telecomputing Workshop reader, you know that the format of this column has been predominately question and answer. My predecessor did a fine job answering literally hundreds of readers' specific inquiries, but as you may have noticed in my first two columns, I've opted for a different approach.

This is not to say that question-and-answer dialogues will cease to be a part of Telecomputing Workshop. On the contrary, I plan to use your questions to steer the direction and content of the column. From time to time it may resemble the previous Q & A sessions. Rather than use specific letters, however, I'd like to concentrate on answering the most frequently asked questions. I encourage you to send in your questions, keeping in mind that they will be answered on a collective basis.

The Modem Market

One of the recurring questions in your letters concerns the selection of modems. What type of modem should I buy for my C-64 or C-128? What speed should the modem be able to handle? How much money will an adequate modem cost? Is there any type of modem I should avoid?

Generally speaking, there are two types of modems available for use with the 64 and 128—direct-connect (sometimes called Commodore-compatible) and standard RS-232. You attach direct-connect modems to your computer's user port, with no need for other hardware, which makes them the least expensive to operate. Standard RS-232 modems are so designated because they require an RS-232 interface to work with a Commodore computer.

Commodore, the largest producer of direct-connect modems, has marketed several models for its 8-bit line of computers. The most popular in this line are the 1650, 1660 and 1670 modems. The 1650 and 1660, which are no longer being produced, are 300-baud, "dumb" modems; dumb because, unlike so-called "smart" modems, they are generally non-programmable devices that can't do much more than dial or answer the phone. On the other hand, the currently popular 1670 is a 1200-baud smart modem that uses a subset of the industry-standard Hayes command set. (The Hayes commands are used to control various features of the 1670: its internal speaker, tone or pulse dialing, the number of rings the modem waits before answering, and so on.) Nowadays, most third-party, direct-connect modems emulate the 1670, and are partially or fully Hayes-compatible.

Standard RS-232 modems, unlike direct-connect modems, are not designed specifically for Commodore computers. They can be attached to any computer that has the standard RS-232 serial interface configuration; unfortunately, Commodore's user port does not have this configuration, so a separate RS-232 interface device is required to make standard RS-232 modems work with your C-64 or C-128. These interfaces usually cost between $25 to $50 in addition to the price of the modem. The vast majority of standard RS-232 modems communicate at either 1200 or 2400 baud and are at least partially Hayes command-compatible.

What's Right for You?

The speed and type of modem you should purchase really depend on your personal needs and budget. Be careful—bargain modems are not always the "great deals" they may appear to be. A few years ago, conventional wisdom held that if you were on a budget, an inexpensive, direct-connect, 300-baud modem was the route to go. But this is no longer the case.

Although 300-baud, direct-connect modems can usually be purchased for under $30, I strongly recommend that, even if you're a beginner, you spend a little extra money and purchase a 1200-baud modem, the prices of which have plummeted drastically over the past year. Also, most telecommunications networks have abandoned additional charges for 1200-baud usage, meaning most services now cost the same for 1200-baud access as for 300-baud. Anything you save initially by purchasing 300 baud could be more than washed away in the long run, because it'll take you four times as long to download text and programs at 300 baud, which simply translates into higher telecommunications bills. Direct-connect, 1200-baud modems like Commmodore's 1670 retail for $75 to $95.

As mentioned above, another advantage most 1200-baud modems have over their 300-baud ancestors is that they are smart. However, not all smart modems are alike. The majority adhere, at least partially, to the Hayes command-set standard, but some do not. Those that don't will, in most cases, create problems when it comes to finding telecommunications software. Two such modems are the Volksmodem 6470 and 6480—I strongly suggest you avoid them.

When it comes to choosing between a direct-connect and a standard RS-232 modem, let your present situation and your future plans be your guide. If you use your C-64 or C-128 exclusively and have no plans to purchase another type of computer, like the Amiga, Macintosh or an MS-DOS machine, then a cheaper, direct-connect modem should serve you well. However, if you own another type of computer or think you'll be purchasing a different one in the not-too-distant future, you most definitely should consider going the standard RS-232 route. This will probably involve a larger initial investment, especially when you consider the fact that you'll need to purchase an interface to operate with your Commodore, but you'll be better off knowing that you'll be able to use that modem with any computer you buy.

These Changing Times

In conclusion, keep in mind that telecommunications, like the entire computer industry, is in a constant state of flux. New technologies bring better, faster and more powerful equipment into the realm of consumer computing. For instance, just two years ago, the least expensive 1200-baud, direct-connect modem would have set you back a minimum

of 150 dollars. Today, that $150 buys you a fully Hayes-compatible, standard RS-232, 2400-baud modem!

With that in mind, here are a few more guidelines to help ensure that the modem technology you buy into today will give you the best possible combination of performance and value.

Identify the *kinds* of telecommunicating you will be doing. If the primary focus of your online activities is sending and receiving electronic mail, then modem speed may not be as important to you as it would be if you intended to transmit or receive large amounts of data or many programs.

Next, identify *where* you'll be doing your telecommunicating. If you plan to use national telecommunications networks, find out what modem speeds are supported by the access nodes in your area and how much they charge for access at various speeds. Also find out what speeds are supported by your local bulletin-board systems.

Another important consideration is the quality of the phone lines. Those areas where fiber optic telephone lines have been installed should have no problems with telecommunications in excess of 9600 baud, while those with older phone lines might incur some difficulty even at 1200 baud. If you're not sure about the phone line technology in your hometown, call your local phone company and ask them about it. After all, it's no fun owning a fast modem if you can't use it effectively at its top speed. ■

Loren Lovhaug is a programmer and writer with lots of telecommunications experience. You can write to him care of:

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GEOWATCH

The discussion of geoWrite Workshop 128, begun in the August issue, now concludes.

By MARTE BRENGLE

Editor's note: In the August issue, Marte Brengle introduced geoWrite Workshop 128 by describing the program's installation procedures, incompatibility factors, fonts and document formatting. She now concludes the discussion.

EDITING

One of the most important things to keep in mind when using any word processing program is to save your work at frequent intervals. Fortunately, geoWrite Workshop 128 automatically updates your document when you go from one page to the next or when you preview a page.

Another good idea is to insert page breaks. These not only make your printed document easier to read, but also help you with insertions and corrections. If you've finished a multi-page document and then decide to insert a paragraph on page 1, gWW 128 has to push aside all the subsequent text to let your new material in. This can be agonizingly slow. If you have a break at the end of that page, however, the program only has to push aside whatever text remains on the page.

Like the space bar, the delete key moves with glacial slowness. If you want to delete more than just one letter at a time, you can do it faster by selecting (highlighting) the particular section and pressing the delete key. Range deletion can also be accomplished by double-clicking on individual words and pressing the delete key or by highlighting the range and using the Cut option from the menu.

GRAPHICS AND IMPORTED TEXT

If you have the Photo Manager accessory on your disk, as well as any photo albums of graphics, you can easily paste in geoPaint graphics to illustrate your text. Unfortunately, you have no say in the side-to-side placement of those graphics—they'll always be centered between the margins. You can overcome this setup to a certain extent by using the Paint Drivers and Paint Overlay features (described below). You can also change—and are told to do so in the documentation—the margins at the point at which the picture is to be inserted. If you frequently use pasted-in graphics and would like to have total control over where they'll appear, you might want to investigate BSW's geoPublish program, which is far more versatile in that respect.

Text imported from other gWW 128 documents isn't subject to centering restrictions. The process of importing the text is rather tedious, though, and it would be nice if gWW 128 allowed for alternate screens as other programs do. As it stands, if you want to move a section of text from one geoWrite document to another, you have to copy it into a text scrap and save it into a text album. If you subsequently use the Cut or Copy command on another document, whatever you've cut or copied automatically replaces what is in the scrap.

Text created with other word processors can also be converted to gWW 128 format. Keep in mind, however, that the original file is converted, and you'll no longer be able to read it with the original word processor. If you don't want that to happen, make sure you use the text grabber only on a *copy* of your original file.

Most of the text grabbers on the disk seem to work quite well, although BSW's documentation doesn't mention that the grabbers are more versatile than they appear. The PaperClip II grabber, for example, works just as well on Pocket Writer files. This is nice to know, because the generic grabbers leave much to be desired.

PRINTING

Printing your document can be one of the trickier procedures with gWW 128. If you have an 80-dpi driver on your disk to write and switch to a 60-dpi driver to print, the entire document has to be reformatted—that can take quite a long time.

Ignore the manual's instructions for using the "2.1 printer drivers on the back of the disk." There are no such things, and the back of the disk is blank. In addition, the gWW 128 manual refers you to the "Choosing a Printer Driver and Printer" section in the GEOS 64 manual. That's of little help, because gWW 128 can't be used with GEOS 64. You'll find the correct instructions on pages 1-11 and 1-15 of the GEOS 128 manual.

The various double-strike and quad-strike printer drivers available on QuantumLink, other networks and BBSs work very well with this program; in fact, your printout quality may be greatly enhanced by them. It would be well worth your time to experiment with one that matches your printer.

GeoWrite Workshop 128 gives you more control over your printout than the original geoWrite did. When you choose Print from the File menu, you'll get a dialog box that lets you indicate which pages to print, what style of type to use and whether your printer uses single sheets or continuous paper.

If you want to print your document out as it appears on the screen, with all the fonts and formatting intact, choose High for high quality. If you want to use your printer's own resident typeface, choose Draft. (The format will be different, of course, since the number of characters per inch will almost certainly be different.) Draft mode selects your printer's Default mode, and some printers—Okimate 20, for example—default to near-letter-quality print.

The procedure changes if you want NLQ printing from other printers. Assuming your printer allows for NLQ, you must have your entire document in the Commodore 10 font for this feature to work. The printing speed will probably be faster than high-quality print, but slower than draft.

PAINT DRIVERS AND PAINT OVERLAY

The Paint Drivers program is one of gWW 128's most interesting applications, yet one of the most sketchily explained. Fortunately, your gWW disk contains a demonstration file, called Cake, that can help you learn how to use the Paint Drivers program. When

using this program, you can approximate the look of a geoPublish document and combine several documents into one for a custom layout.

Paint Drivers changes your geoWrite documents into geoPaint documents. One of the unwritten advantages of doing this is that all font information is changed to graphics information, and you are freed from the necessity of having every font present on your disk in order for your document to print out properly.

Make sure you have plenty of room left on your work disk, because a new geoPaint document is created while you're working. The manual suggests that you keep available at least 5K of space, but I think it would be to your advantage to have more. Copy the Paint Drivers file onto your work disk and double-click on it. You'll get a list of all the printer drivers on the disk, and you can click on the one you usually use. The Paint Drivers application creates Paint Pages and Paint Overlay on your disk.

If you choose Paint Pages, each of the pages in your document is converted into an individual geoPaint file on your disk. The files are called Page 1, Page 2, and so forth. If you choose Paint Overlay, each page in the document is combined into a single geoPaint document. Before you try this feature, be very sure that your material is formatted correctly. The Cake demonstration file has been set up in advance for this.

When you use Select Printer to choose Paint Overlay as your printer driver, open the Cake file and choose Print from the File menu. When the dialog box appears, make sure you'll be printing from page 1 to page 2. The program then creates a geoPaint file, called Overlay, that contains the images of both pages combined. Note that any time you use the Paint Overlay feature, the resulting file is always called Overlay. If you have a file with that name already on your disk, everything from the new document is overlaid on what's already there. Once you've created your document, rename it to something more representative of what it contains.

To print your new geoPaint document, you must first switch back to your regular printer driver, and then you can print the document as you normally would.

Using the overlay feature also lets you create documents in columns. If you have graphics in those documents, they'll appear centered side to side in the column rather than in the center of the document itself.

The main thing to keep in mind is that although BSW refers to Paint Overlay and Paint Pages as printer drivers, they create files *on your disk, not on your printer*. You must switch back to your regular printer driver before you print your documents. ■

Marte Brengle has spent a lot of time working with Commodore special interest groups on national networks. You can contact her on Q-Link as Sunny G.

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COMMODORE CLINIC

Why you should never save anything to your Q-Link disk; how to use an REU with programs you're writing; how a program generates Out of Memory errors.

By LOU WALLACE

SOFTWARE

Q *I have a tough time running the Autumn program in* RUN*'s Special Issue #4. All I get is ILLEGAL QUANTITY ERROR IN LINE 110. Am I doing something wrong? I first load and run Sprite ML Maker, then load and run Autumn.*

—PHIL KEIM
ROCHESTER, NY

A The Illegal Quantity error message tells you that you have entered into a Data statement a number greater than 255, the maximum value a byte can hold. The data is in lines 470–730 of the listing, so recheck your Data statements for a number or numbers that are greater than 255. Make the change(s) (don't forget to press return on each line right after you make any changes) and re-save the program before running it.

Q *Can I use Berkeley Softworks' geoProgrammer to make my own self-standing assembly language programs, or is it just for use with GEOS applications?*

—HARRY T. WAITE IV
APO, NY

A Yes, you can use geoProgrammer for generating normal Commodore (non-GEOS) applications, but you'll also need GEOS to run the assembler, geoWrite to generate the source files and geoPaint to create any graphics you want to include in your program. And the geoDebugger needs the GEOS Kernal to run. If you don't already have GEOS and don't want to write GEOS applications or accessories, then you should consider getting a different assembler. (See the May 1988 *RUN* for a roundup of assemblers.)

Q *I just bought Q-Link's Rabbitjack Casino disk. Ever since I saved it to my Q-Link disk, I can no longer automatically boot up to log on with my C-128. Can you tell me why this happens? Q-Link doesn't seem to know. It's a minor inconvenience, but I miss the autoboot feature. Otherwise, the disk works fine.*

—JESSE JAY
WALTHAM, MA

A When you copied the Rabbitjack software to your Q-Link disk, you also overwrote the autoboot sector (track 1) that has the information for autobooting the disk to your 128. Get another boot disk from QuantumLink, and never again save anything to it.

HARDWARE

Q *My C-64 seems to have lost its color. When I first turn it on, there is color on the screen, but within 5–10 seconds the screen goes black and white. Should I replace the color chip or could other chips be causing the problem?*

—CALVIN F. STANFILL
NASHVILLE, TN

A Most likely you've got a bad VIC-II graphic chip. If you're technically competent, buy one from a service center or a mail order company that sells computer components, and replace it yourself. But I recommend you take it to a Commodore service center where they can determine the exact cause of the problem and replace only what is absolutely required.

Q *How can I get my C-64 to work with a 24-pin dot matrix printer?*

—E. BURK
SPARTA, NJ

A Equipped with a standard C-64 printer interface, your machine can use any type of printer that has a parallel interface. This includes 9- and 24-pin impact printers, ink jet or thermal printers, laser printers, such as the HP Laser Jet or Okimate Laserline, and even Postscript-compatible printers like the Apple LaserWriter.

The real question concerns what C-64 software supports these various printers. If you already have a 24-pin printer, you must also have software that specifically supports yours, and not just any 24-pin printer. If you don't yet have a printer, first find a software package that does what you want and supports the type of printer you desire; then buy your printer.

Q *I need a hard drive for my C-128D. Can I use an IBM-style controller and interface for a Seagate ST-506 (5 meg), an ST-419 (15 meg) or an ST-225 (20 meg), preferably in RLL format? Will I be able to use the hard drive with GEOS or GEOS 128? I would rather not spend the $800 or $900 on the system Xetec offers.*

—JASON HULL
SPRINGDALE, AR

A That's a great idea, but, sad to say, one that's not possible (yet). To use any hard drive, software must be provided to drive it, to perform file management of extremely large numbers of programs or datafiles, and yet still be compatible with the majority of non-copy-protected software. This is what Xetec (and others) have done. So far, no one has developed a combination interface and software for off-the-shelf hard drives. But whoever does so will likely make a lot of money!

As for using a hard drive with GEOS, current GEOS software will not work with any hard drive for a CBM computer because of copy-protection problems.

PROGRAMMING

Q *I've been writing an adventure game in Basic on my C-128. I've gotten to the stage where I'm able to play it, but after a certain number of entries, I get an Out of Memory message.*

My manual states, "Either there is no more room for program code and/or program variables, or there are too many nested Do, For or Gosub statements in effect."

I assume that there are too many For-Next

loops, because my program uses these to determine its next action. I've tried using the Trap statement, but that only results in a computer lockup.

Have you any suggestions?

—R. JAKLITSCH
WICKLIFFE, OH

A There are a couple of possible problems. First, you may be out of variable memory. Even though there's a 64K bank in the 128 set aside for variables, it's not difficult to run out of memory, if you use enough variables. Consider this DIMension statement:

```
DIM A$(21414)
```

This allocates enough memory for 21,414 string variables in the array A$( ), leaving four bytes free. Increase it to 21,415, and you get an Out of Memory error message. You're probably not using arrays this large, but it takes only a few multidimensional arrays to eat up all your variable memory.

A more likely possibility is that you're out of stack space. The computer reserves a section of memory called a stack, where it holds information it will need later. It's called a stack because programmers like to think of it as a stack of values and addresses, with the most recent addition on the bottom. Whenever you use a Do-Loop, a Do-While, a For-Next loop or a Gosub in a program, an entry is placed on the stack so the computer can find its way back when executing the loop or subroutine. If you're jumping in and out of loops, or doing recursive calls of a subroutine, you can very quickly run out of stack space, resulting in an Out of Memory error. As an example, enter this one-line program and run it:

```
10 GOSUB 10
```

You'll find that almost as soon as you press return, it will print an Out of Memory error. This small program has filled the stack by repeatedly calling itself, and never reaching a Return statement, which would remove an entry from the stack.

Check your program again, and perhaps you will find that one of the above is causing the problem.

Q *Can you provide me with an algorithm that takes a number assigned to a variable, say 17543, parses it into its individual component digits—1, 7, 5, 4, 3—adds each of those numbers separately to character code 48 (0) and pokes the result into five sequential screen locations?*

—KEITH W. BEDARD
BENSENVILLE, IL

A I can. Below is a C-64 routine that does just that, and, in addition to meeting your particular needs, it's an illustrative example of converting variable datatypes. In this case, we have a number that we convert to a string variable (essentially a word), then parse (separate) it into its component digits. These are then converted back into numbers, stored in an array and then poked to the supplied screen address.

First, we convert the supplied number, N (17543), into a string variable, N$, using the STR$ function (line 1020). Next, we determine the length of this string (line 1030). This must be decreased by one (also line 1030) because STR$ results in a string with an extra digit on the left (usually a space, but it could also be a minus sign). We then remove the extra leftmost character and reassign the new value to N$ (line 1040) using the RIGHT$ function. Then we create the array of numeric values for each character, using a combination of VAL and MID$ (lines 1060–1080). Finally, we have a short loop that pokes the array onto the screen, starting at the screen address that is assigned to AD (line 1100).

Remember that lines 1000–1010 contain values for N and AD, so you will need to change them for your purposes. Also, since the array NI( ) is not dimensioned, it uses the default maximum value of 11 elements (0–10). For numbers longer than ten digits, you'll need to DIMension that array to a larger size. And you'll notice that only the number is poked to the screen; if you need colored numbers, you'll need to poke the appropriate color memory location with the desired color (POKE (55296 + (AD – 1024)),color).

```
1000 N = 17543:REM N IS THE NUMBER
     TO PARSE
1010 AD = 1024:REM SCREEN ADDRESS
1020 N$ = STR$(N):REM CONVERT IT TO
     A STRING VARIABLE
1030 L = LEN(N$) – 1:REM SHORTEN IT
     BY ONE
1040 N$ = RIGHT$(N$,L):REM USE ONLY
     THE ACTUAL CHARACTERS
1050 REM CREATE AN ARRAY OF
     VALUES
1060 FOR I = 1 TO L
1070 NI(I) = VAL(MID$(N$,I,1))
1080 NEXT
1090 REM POKE THE DATA TO THE
     SCREEN
1100 FOR I = 1 TO L:POKE AD + I – 1,
     NI(I) + 48:NEXT
```

Q *I'd like to use my 1750 RAM expansion module with programs I'm writing to shift stored data to the REU, retrieve the data for use in the programs, put the data back into the unit so that I can use RAM memory for other work, and save the RAM data to disk for later use. Could you give me an example of how to do this?*

—ROBERT E. PORTER
CANFIELD, OH

A I'll give you two examples. The first is to use Commodore's official RAMDOS software, which simulates a high-speed disk drive. With a RAM drive you can quickly load and save your data between the program you're writing and the drive. You can even chain several programs together so they act as one. And it's done so fast that it's usually transparent to the user.

If you recently bought your RAM cartridge, the RAMDOS software was probably already on the disk that came with the unit. Earlier buyers of a 1700 or 1750 unit did not get it, as it wasn't completed until this year. Commodore has now released it for public use, and you'll find it on most commercial BBS networks, ►

such as QuantumLink, GEnie and CompuServe. You'll also find it on many smaller BBSs, including *RUN*'s own RUNning Board (603-924-9704).

The second example is to use the Basic 7.0 commands Stash, Fetch and Swap to store and recall data from your programs. I've given the commands and their parameters below.

FETCH,#BYTES,INTSA,EXPSA,EXPB
STASH,#BYTES,INTSA,EXPSA,EXPB
SWAP,#BYTES,INTSA,EXPSA,EXPB

#BYTES—the number of bytes to Fetch, Stash or Swap

INTSA—the starting address (0–65535) of the computer's memory

EXPSA—the starting address (0–65535) of the expansion RAM

EXPB—the memory expansion bank number (0–1 for 1700, 0–7 for 1750)

The commands themselves are quite easy to understand, but you must know a great deal about the 128's memory organization in order to use them. I've written a sample program that stores the 128's 40-column graphics screen in the RAM expansion cartridge, waits for a keypress, then restores it.

```
10 GRAPHIC1,1:REM HIGH RESOLUTION
20 REM CREATE A SCREEN TO STORE
30 FOR I = 1 TO 16
40 C = INT(RND(1)*16) + 1
50 COLOR 1,C
60 X = INT(RND(1)*320)
70 Y = INT(RND(1)*200)
80 XR = INT(RND(1)*99) + 2
90 YR = XR*.769
100 CIRCLE 1,X,Y,XR,YR
110 NEXT I
120 STASH 9200,7168,0,0
130 GRAPHIC 1,1:REM CLEAR THE
    SCREEN
140 GETKEY A$:REM WAIT UNTIL A KEY
    IS PRESSED
150 FETCH 9200,7168,0,0:REM RESTORE
    THE SCREEN
160 GETKEY A$
170 GRAPHIC 0
```

This is just an example; there are many other ways to write the program, depending on your needs, such as having many different graphic screens, text screens, banks of sprites or function key definitions.

Q *Can Commodore 64 and 128 programs be converted to run on an IBM clone XT, with MS-DOS and GW Basic?*

—T. WILDER
PETERBOROUGH, NH

A If the programs are simple Basic programs, it is possible to convert them. However, if they use graphics, sprites, sound commands or any other machine-specific abilities, the conversion problems become significant, since IBM clones have limited sound, no sprites and different graphics resolutions. Also, you will have to rewrite any disk accesses, as they use different commands and techniques. ■

Do you have a problem or question about your Commodore computer system, software or programming? Send your questions to: Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458.

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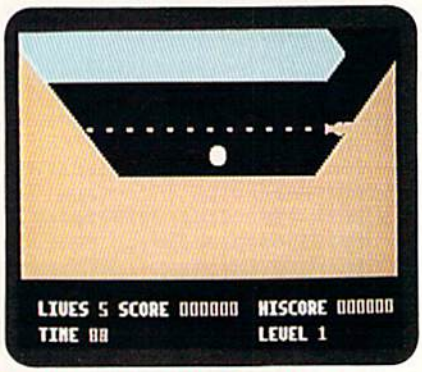
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From p. 48.

```
    Ø491Ø8D1ØDØCE          :REM*3Ø
147 DATA 2E98AD2E98C9FFFØØ34C 7
    E85A9Ø78D2E98A9Ø18D 2C988D2
    A988D2B986ØAD          :REM*232
148 DATA 2B98DØ23EEØ7DØEEØ9DØ E
    E2D98AD2D98C9Ø8FØØ3 4CA785A
    9ØØ8D2D98A9Ø4          :REM*23Ø
149 DATA 8D2C988D2A988D2B986Ø A
    D2B98DØ23CEØ7DØCEØ9 DØCE2D9
    8AD2D98C9FFFØ          :REM*143
15Ø DATA Ø34CDØ85A9Ø78D2D98A9 Ø
    28D2C988D2A988D2B98 6ØAD19D
    Ø8D19DØ29Ø1DØ          :REM*62
151 DATA Ø34C31EAAD12DØC9FDBØ 2
    BAØFD8C12DØAD18DØ29 FØØ9ØA8
    D18DØAD11DØ29          :REM*118
152 DATA F81869Ø78D11DØAD16DØ 2
    9F81869Ø38D16DØ2Ø72 884C3A8
    6AD11DØ1829F8          :REM*92
153 DATA 6D2D988D11DØ18AD16DØ 2
    9F86D2E988D16DØAD18 DØ29FØØ
    9ØC8D18DØAØDØ          :REM*2ØØ
154 DATA 8C12DØ2Ø7B8868A868AA 6
    84ØAD299849Ø48D2998 6ØAD2A9
    8C9Ø1FØØDC9Ø2          :REM*193
155 DATA FØ12C9Ø3FØ17C9Ø4FØ1C 6
    ØA9Ø78D2E982Ø8166Ø A9Ø78D2
    D982Ø8E866ØA9          :REM*21
156 DATA ØØ8D2E982Ø8166ØA9ØØ 8
    D2D982Ø8E866ØAD16DØ 29F8186
    D2E988D16DØ6Ø          :REM*161
157 DATA AD11DØ29F8186D2D988D 1
    1DØ6Ø38AD2F98E95Ø8D 2F98BØØ
    3CE28986Ø18AD          :REM*21Ø
158 DATA 2F98695Ø8D2F989ØØ3EE 2
    8986ØEE3Ø98AD3Ø98C9 5ØDØ161
    8AD2F98695Ø8D          :REM*162
159 DATA 2F98AD289869ØØ8D2898 A
    9ØØ8D3Ø986ØCE3Ø98AD 3Ø98C9F
    FDØ1638AD2F98          :REM*41
16Ø DATA E95Ø8D2F98AD2898E9ØØ 8
    D2898A94F8D3Ø986ØAD 2A98C9Ø
    1FØØDC9Ø3FØØD          :REM*249
161 DATA C9Ø4FØØDC9Ø [illegible]ØØD6Ø2Ø B
    9866Ø2ØDA866Ø2Ø9 [illegible] 6Ø2ØAA8
    66ØA9ØØ85FDA9          :REM*44
162 DATA 2Ø85FEA9ØØ85FBA97818 6
    D299885FC18A5FD6D3Ø 9885FD9
    ØØ2E6FE18A5FD          :REM*213
163 DATA 6D2F9885FD9ØØ2E6FE18 A
    5FE6D289885FE6Ø2ØFB 8624Ø8
    62ØC184AD12DØ          :REM*239
164 DATA C9Ø9DØF92Ø4986AD18DØ 4
    91Ø8D18DØA9ØØ8D2B98 6Ø4A4A4
    A4A6Ø29ØF1869          :REM*127
165 DATA 2899Ø7B992Ø7F6ØF8AD 1
    69838CD1998ØØ2CDØ14 AD17983
    8CD1A989Ø21DØ          :REM*168
166 DATA Ø9AD189838CD1B989Ø16 A
    D17988D1A98AD18988D 1B98AD1
    6988D1998D82Ø          :REM*214
167 DATA 2388D86ØF818AD18986D 1
    C988D18989Ø14AD1798 1869Ø18
    D17989ØØ918AD          :REM*165
168 DATA 169869Ø18D1698D8AD18 9
    82Ø7587AØ3C2Ø7A87AD 1898AØ3
    D2Ø7A87AD1798          :REM*16
169 DATA 2Ø7587AØ3A2Ø7A87AD17 9
    8AØ3B2Ø7A87AD16982Ø 7587AØ3
    82Ø7A87AD1698          :REM*26
17Ø DATA AØ392Ø7A876ØAD1C98AØ 9
    62Ø7A876ØAD1B982Ø75 87AØ4C2
    Ø7A87AD1B98AØ          :REM*25
171 DATA 4D2Ø7A87AD1A982Ø7587 A
    Ø4A2Ø7A87AD1A98AØ4B 2Ø7A87A
    D1998Ø7587AØ           :REM*46
172 DATA 482Ø7A87AD1998AØ492Ø 7
    A876ØA9978DØØDDA915 8D18DØA
    91B8D11DØA9C8          :REM*21Ø
173 DATA 8D16DØ6ØA9ØØ8D2ADØ8D 2
    BDØ6ØA9ØA8D2ADØ8D2B DØ6ØA93
    F8DØ2DDA9C68D          :REM*153
174 DATA ØØDDA9ED8D18DØA9DØ8D 1
    6DØA9138D11DØ6ØAØØØ B93A98C
    9FFFØØ7991E98          :REM*11
175 DATA C84CAØ886ØAØØØA2Ø3A9 Ø
    Ø85FBA9D885FCADØ78Ø 91FBC8D
    ØFBE6FCCADØF6          :REM*215
176 DATA AØØØ91FBC8CØE8DØF9A9 Ø
    9AØØØ9948DBC8CØ78DØ F86ØA9Ø
    Ø8D1ØDØA91F8D          :REM*167
177 DATA 15DØA9FF8D1BDØAØØ9B9 D
    E9799ØØDØ881ØF76ØAØ ØØB1FBF
    ØØB9D2Ø7B9D2Ø          :REM*62
178 DATA 7FE8C84CFB886Ø2Ø9E88 2
    Ø84882ØAF882ØC1842Ø DE882Ø7
    D896ØAD1D98AØ          :REM*247
179 DATA 3Ø2Ø7A876ØAD2198FØ1C E
    E2298AD22988DØ8D4C9 28DØØFA
    9148D2298A9ØØ          :REM*134
18Ø DATA 8D2198A92Ø8DØBD46ØA9 Ø
    ØA1899ØØD4881ØFA6Ø A9ØF8D1
    8D4A9128DØCD4          :REM*227
181 DATA A9228DØDD4A9ØA8DØ5D4 A
    9498DØ6D4A9148DØ1D4 A9ØC8DØ
    ØD4A9Ø58DØFD4          :REM*149
182 DATA 6ØAD25982Ø7587AØ7F2Ø 7
    A87C8AD25982Ø7A876Ø AD1F98F
    Ø2318AD2Ø9869          :REM*227
183 DATA Ø88D2Ø98AD2Ø988DØED4 3
    8C9FØ9ØØFA9138D2Ø98 A9ØØ8D1
    F98A9128DØ4D4          :REM*76
184 DATA 6ØA9818DØ4D48DØBD48D 1
    2D4A9148DØ1D4A9288D Ø8D4A93
    C8DØFD4A9118D          :REM*113
185 DATA Ø5D48DØCD48D13D4A922 8
    DØ6D48DØDD48D14D4AØ ØØA2ØØ8
    C29DØC8DØFAE8          :REM*19Ø
186 DATA DØF7EE1E98AD1E98C9Ø5 D
    ØEDA9ØØ8D1E98A9Ø18D 29DØ6ØA
    9ØØ8D7497A9ØB          :REM*48
187 DATA 8D7597A9Ø28D2ØDØA9ØØ 8
    D21DØ2Ø998C2Ø8F8CA9 ØØ2ØD5F
    FA9932ØD2FFA9          :REM*54
188 DATA Ø1AØØØ99ØØD899ØØD999 Ø
    ØDA9999DBC8DØF1AØØØ B94997F
    ØØ72ØD2FFC84C          :REM*1
189 DATA 448A2Ø268CAØØ3B1FD8D 7
    397C8B1FD8D7297C8B1 FD8D719
    72ØA28BCE7597          :REM*82
19Ø DATA FØØBAD7497DØ1B2Ø378C 4
    C538AAØØØB9AB97FØØ7 2ØD2FFC
    84C7B8A2ØCA8B          :REM*233
191 DATA 2ØBB8C6ØA5FD8DDB97A5 F
    E8DDC97CE7597FØ26A9 3Ø85FDA
    96Ø85FEA93685          :REM*254
192 DATA A3A96Ø85A4AØØ5B1FD91 A
    3881ØF9CE7597FØØ8AØ Ø52Ø528
    C4CAF8AADDB97          :REM*163
193 DATA 85FDADDC9785FEAØØ3AD 1
    69891FDC8AD179891FD C8AD189
    891FD2ØCA8BAØ          :REM*1Ø1
194 DATA ØØB97697FØØ72ØD2FFC8 4
    CE58AADDB9785FDADDC 9785FEE
    8DØFDC8CØ8ØDØ          :REM*146
195 DATA F82ØCA8BACDD97ADDB97 8
    5FDADDC9785FEB1FD49 8Ø91FDA
    DØØDC291ØFØ68          :REM*118
196 DATA ADØØDCC97EFØØFC97DFØ 1
    DC97BFØ29C977FØ3D4C FB8A18B
    1FD69Ø1297FC9          :REM*68
197 DATA 1BDØØ2A9Ø191FD4CFB8A 3
    8B1FDE9Ø1297FDØØ2A9 1A91FD4
    CFB8AB1FD297F          :REM*65
198 DATA 91FDCEDD97ADDD97C9FF D
    ØØ5A9ØØ8DDD974CFB8A B1FD297
    F91FDEEDD97AD          :REM*89
199 DATA DD97C9Ø3DØØ5A9Ø28DDD 9
    74CFB8AACDD97ADDB97 85FDADD
    C9785FEB1FD29          :REM*69
2ØØ DATA 7F91FD2ØBB8C2Ø778C6Ø F
    8AD169838CD73979Ø1C DØ14AD1
    79838CD72979Ø          :REM*116
2Ø1 DATA 11DØØ9AD189838CD7197 9
    ØØ6A9Ø18D7497D8D86Ø 2Ø268CA
    2Ø92Ø6D8C2Ø37          :REM*5
2Ø2 DATA 8CCA1ØF72Ø268CA2Ø9AØ Ø
    3B1FD8D7Ø972ØA38CC8 2ØA88CA
    D7Ø97C82ØA88C          :REM*19Ø
2Ø3 DATA AØØ4B1FD8D7Ø97C8C82Ø A
    38C2ØA88CAD7Ø97C82Ø A88CAØØ
    5B1FD8D7Ø972Ø          :REM*55
2Ø4 DATA A38CC8C8C82ØA88CAD7Ø 9
    7C82ØA88C2Ø378CCA1Ø B86ØA92
    785FBA9Ø585FC          :REM*216
2Ø5 DATA A9ØØ85FDA96Ø85FE6Ø18 A
    5FB692885FBA9ØØ65FC 85FC18A
    5FD69Ø685FDA9          :REM*33
2Ø6 DATA Ø65FE85FE6Ø38A5A3E9 Ø
    685A3A5A4E9ØØ85A438 A5FDE9Ø
    685FDA5FEE9ØØ          :REM*149
2Ø7 DATA 85FE6ØAØØ2B1FD91FB88 1
    ØF96Ø2Ø998C2Ø8F8CA9 ØØ85FBA
    96Ø85FCA23DAØ          :REM*173
2Ø8 DATA 6ØA9FB2ØD8FF6ØA9ØBA2 B
    ØAØ8C2ØBDFF6ØA9ØØA2 Ø8AØFF2
    ØBAFF6Ø4A4A4A          :REM*214
2Ø9 DATA 4A6Ø1829ØF693Ø91FB6Ø 4
```



Gobble up the gold and watch out for cannon fire!

```
    Ø3Ø3A544F5Ø54454E2E 4FADØØD
    C291ØDØF96ØAD        :REM*4
21Ø DATA 11DØ29EF8D11DØAØØØA2 1
    FA9ØØ85FBA92Ø85FCA9 Ø391FBC
    8DØFBE6FCCA1Ø        :REM*78
211 DATA F6A9932ØD2FF2ØE58DA9 4
    385A3A99285A42Ø478E A2Ø28E4
    8972ØFB8DA9FC        :REM*14
212 DATA 85A3A99385A42Ø478EA9 1
    485FBA92Ø85FC2ØØC8E A9932ØD
    2FFA2Ø68E4897        :REM*236
213 DATA 2ØFB8DA92585A3A99485 A
    42Ø478EA2Ø98E48972Ø FB8DA9C
    685A3A99485A4        :REM*25
214 DATA 2Ø478EA2Ø28E48972ØFB 8
    DA9EF85A3A99485A42Ø 478EA9E
    485FBA92785FC        :REM*16
215 DATA 2ØØC8EA9932ØD2FFA964 8
    5A3A99585A42Ø478EA2 Ø38E489
    72ØFB8DA9FC85        :REM*139
216 DATA A3A99385A42Ø478EA2Ø8 8
    E48972ØFB8DA92585A3 A99485A
    42Ø478EA9B485        :REM*34
217 DATA FBA92F85FC2ØØC8EA993 2
    ØD2FFA2Ø18E48972ØFB 8DA9C68
    5A3A99485A42Ø        :REM*27
218 DATA 478EA2Ø28E48972ØFB8D A
    98D85A3A99585A42Ø47 8E2ØE58
    DA98485FBA937        :REM*1
219 DATA 85FC2ØØC8EA9932ØD2FF A
    D11DØØ91Ø8D11DØ6ØA2 Ø98E469
    7A9F185A3A991        :REM*2Ø1
22Ø DATA 85A42Ø478ECE4697DØFØ 6
    ØA91A85A3A99285A42Ø 478ECE4
    897DØF96ØA9ØØ       :REM*1Ø5
221 DATA 85FDA9Ø485FEAØ27B1FD 9
    1FB881ØF918A5FD6928 85FDA9Ø
    Ø65FE85FE18A5        :REM*95
222 DATA FB695Ø85FBA9ØØ65FC85 F
    CEE4797AD4797C919DØ D3A9ØØ8
    D47976ØAØØØB1        :REM*136
223 DATA A3FØ132ØD2FF18A5A369 Ø
    185A3A9ØØ65A485A44C 498E6Ø9
    38E05ØD2Ø2Ø2Ø        :REM*141
224 DATA 2Ø2Ø2Ø2Ø52554E2Ø4D41 4
    7415A494E452Ø5Ø5245 53454E5
    4532E2E2EØDØD        :REM*188
225 DATA ØDØDØD2Ø2Ø2Ø2Ø2Ø2Ø2Ø 2
    Ø2Ø2Ø5255424245522Ø 42414E4
    449542Ø42414C        :REM*164
226 DATA 4CØDØDØDØDØDØDØD2Ø2Ø 2
    Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø4259 2Ø43484
    1524C4553204F        :REM*228
227 DATA 5243555454ØDØDØDØDØD Ø
    DØD2Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø 2Ø48495
    42Ø123C535Ø41        :REM*31
228 DATA 43453E922Ø544F2Ø504C 4
    159ØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ        :REM*76
229 DATA ØØØØØØ3CØØØØ3CØØØØ3C Ø
    ØØØ3CØØØØØØØØØØØØØ ØØØØØØØ
    Ø3CØØØØ3CØØØØ       :REM*93
23Ø DATA 3CØØØØ3CØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØDEØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ        :REM*2Ø6
231 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØ3FF CØØ3FFC
    ØØ3FFCØØØØØØØ       :REM*129
232 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØDEØØØ
    ØØØØØØØØØØØØ        :REM*134
233 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    Ø7EØØØ1FF8ØØ1FF8ØØ3 FFCØØ3F
    FCØØ3FFCØØ3FF        :REM*242
234 DATA CØØ3FFCØØ1FF8ØØ1FF8Ø Ø
    Ø7EØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØFFØØØØØØØ        :REM*132
235 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØ18ØØØ
    Ø7EØØØ7EØØØØ        :REM*85
236 DATA 18ØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØFF        :REM*33
237 DATA FF2Ø6F72ØØØØØØØØØØØØ Ø
    ØØØAAABABAFAFBFBFFF FFFFFFF
    FFFFFFFFFAAAA        :REM*78
238 DATA AAAAAAAAAAAAAAAAA8A8 A
    ØA8Ø8ØCØCØFØFØFCFC FFFFFFF
    FFCFCFØFØCØCØ        :REM*1Ø2
239 DATA Ø2Ø2ØAØA2A2AAAAA8Ø8Ø A
    ØAØA8A8AAAAAAAA2A2A ØAØAØ2Ø
    2AAAAEAEAFAFA        :REM*58
24Ø DATA FEFEØ3Ø3ØFØF3F3FFFFF F
    FFF3F3FØFØFØ3Ø38Ø8Ø AØAØA8A
    8AAAAØ2Ø2ØAØA        :REM*121
241 DATA 2A2AAAAAFFFFFEFEFAFA E
    AEAFFFFBFBFAFAFABAB ØØØØØØ5
    Ø5ØØØØØØØ28AA        :REM*18
242 DATA AAAAAAAAAA28ØØØ2AAAA A
    AAAØ2ØØØØ8ØAAAAAAAA 8ØØØØØØ
    ØØØØØØØØØØØØ        :REM*44
243 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ        :REM*181
244 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ        :REM*18Ø
245 DATA ØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØ3Ø3Ø        :REM*95
246 DATA 3Ø3Ø3Ø3Ø3Ø3F3FØCØCØC Ø
    CØCØC3F333333333333 33ØC3F3
    Ø3Ø3Ø3C3Ø3Ø3F        :REM*191
247 DATA ØF3Ø3Ø3ØØFØ3Ø33C3FØC Ø
    CØCØCØCØCØC333F3F3F 3333333
    32A2222222222        :REM*29
248 DATA 222AØ828Ø8Ø8Ø8Ø8Ø82A 2
    AØ2Ø2Ø22A2Ø2Ø2A2AØ2 Ø2Ø22AØ
    2Ø22A22222222        :REM*197
249 DATA 2AØ2Ø2Ø22A2Ø2Ø2ØØAØ2 Ø
    22A2A2Ø2Ø2Ø2A22222A 2AØ2Ø2Ø
    2Ø2Ø2Ø2Ø22A22        :REM*224
25Ø DATA 22222A22222A2A222222 2
    AØ2Ø2Ø23333333F3F33 3333ØF3
    Ø3Ø3Ø3Ø3Ø3ØØF        :REM*58
251 DATA ØC3333333333333ØC3C33 3
    3333F3C3333Ø51Ø1Ø1Ø 111111Ø
    4Ø41111111511        :REM*33
252 DATA 1111111515151111111 1
    51Ø1Ø1Ø141Ø1Ø15Ø411 1111111
    111Ø411111111        :REM*9Ø
253 DATA 1111111Ø4151Ø1Ø1Ø141Ø 1
    Ø151411111115141111 ØØØØØØØ
    ØØØØØØØØØØØØ        :REM*98
254 DATA ØØØØØØØØØØ4343434343 4
    3434343434343434343 4343434
    3434343434343        :REM*18Ø
255 DATA 4343434343434343434343 4
    343434343Ø04Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø         :REM*147
256 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4ØØØ434343        :REM*213
257 DATA 4343434343434343434343 4
    3434343434343434343 4343434
    3434343434343        :REM*2Ø9
258 DATA 4343434343434343434343 4
    3434343434344Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø         :REM*47
259 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø494343 4
    3434343434343434343 4343434
    343444Ø4Ø4Ø4Ø        :REM*174
26Ø DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4943 4343434
    3434343434343        :REM*27
261 DATA 4343434343525340514Ø 5
    14Ø514Ø514Ø514Ø514Ø 514Ø514
    Ø514Ø514Ø5149        :REM*214
262 DATA 4343434343434343434343 4
    3434344Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø         :REM*91
263 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    9434343434343434343 4343444
    Ø4Ø4Ø4Ø4Ø4Ø4Ø          :REM*248
264 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø49434
    3434343434343        :REM*97
265 DATA 4341424242424242424242 4
    2424242424242424242 4242424
    2424245Ø4Ø4Ø         :REM*76
266 DATA 4Ø4Ø4943434343434343 4
    1424242424242424242 4242424
    2424242424242        :REM*18
267 DATA 4242424242424254Ø4Ø 4
    Ø4Ø4Ø49434343434341 4242424
    2424242424242        :REM*238
268 DATA 4242424242424242424242 4
    2424242424242464Ø4Ø 4Ø4Ø4Ø4
    Ø494343434142        :REM*48
269 DATA 4242424242424242424242 4
    2424242424242424242 4242424
    2424246Ø4Ø4Ø         :REM*11
27Ø DATA 4Ø4Ø4Ø4Ø4Ø4943444Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø          :REM*44
271 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4949Ø04Ø4Ø 514Ø514
    Ø514Ø514Ø514Ø        :REM*1Ø7
272 DATA 514Ø514Ø514Ø514Ø514Ø 5
    14Ø514Ø514Ø514Ø514Ø 514Ø514
    Ø514Ø5452Ø4Ø         :REM*118
273 DATA 4Ø4Ø4Ø4Ø4B4242424242 4
    2424242424242424242 4242424
    2424242424242        :REM*6
274 DATA 4242424242424242424Ø 4
    Ø4Ø4Ø4B424242424242 4242424
    2424242424242        :REM*118
275 DATA 4242424242424242424242 4
    2424242424242424Ø4Ø 4Ø4Ø4Ø4
    C424242424242        :REM*164
276 DATA 4242424242424242424242 4
    2424242424242424242 4242424
    2424242424Ø4Ø        :REM*252
277 DATA 4Ø4Ø4Ø4Ø4C4242424242 4
    2424242424242424242 4242424
    2424242424242        :REM*241
278 DATA 4242424242424242424Ø0 5
```

```
    2534Ø514Ø514Ø514Ø51 4Ø514Ø5
    14Ø514Ø514Ø51       :REM*2Ø1
279 DATA 4Ø514Ø514Ø514Ø514Ø51 4
    Ø514Ø514Ø514Ø514Ø4Ø ØØ42424
    2424242424242       :REM*114
28Ø DATA 42424242424242424242 4
    242424242424242424 4242424
    24245Ø4Ø4Ø4Ø        :REM*17Ø
281 DATA 4Ø424242424242424242 4
    242424242424242424 4242424
    2424242424242       :REM*135
282 DATA 42424242424245Ø4Ø4Ø 4
    Ø424242424242424242 4242424
    2424242424242       :REM*235
283 DATA 42424242424242424242 4
    24242424242460Ø4242 4242424
    2424242424242       :REM*193
284 DATA 42424242424242424242 4
    242424242424242424 4242464
    Ø4Ø4Ø4Ø4ØØØ42        :REM*36
285 DATA 42424242424242424242 4
    242424242424242424 4242424
    2424242424242       :REM*114
286 DATA 454Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø5Ø 4
    242424242424242424 4242424
    2424242424242       :REM*69
287 DATA 42424242424242424242 4
    2454Ø4Ø4Ø4Ø4Ø4Ø4743 5Ø42424
    2424242424242       :REM*236
288 DATA 42424242424242424242 4
    242424242424242424 4246Ø4Ø4
    Ø4Ø4Ø4Ø474343        :REM*44
289 DATA 435Ø4242424242424242 4
    242424242424242424 4242424
    2424242424242       :REM*115
29Ø DATA 464Ø4Ø4Ø4Ø4Ø47434343 4
    343484Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø        :REM*11Ø
291 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4743434343 4343434
    84Ø4Ø4Ø4Ø4Ø4Ø        :REM*34
292 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø474343434343        :REM*6Ø
293 DATA 43434343484Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø        :REM*67
294 DATA 4Ø4Ø4Ø47434343434343 4
    34343434348514Ø514Ø 514Ø514
    Ø514Ø514Ø514Ø        :REM*97
295 DATA 514Ø514Ø514Ø514Ø514Ø 5
    4524343434343434343 4343434
    343434848Ø4Ø4Ø       :REM*132
296 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø47434
    3434343434343        :REM*166
297 DATA 434343434343434848Ø4Ø 4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø        :REM*17Ø
298 DATA 47434343434343434343 4
    343434343434343484Ø 4Ø4Ø4Ø4
    Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø        :REM*1Ø5
299 DATA 4Ø4Ø4Ø4Ø4Ø4Ø4Ø4Ø47 4
    343434343434343ØØ ØØØØØØØ
    58E2Ø2Ø2Ø494E        :REM*196
3ØØ DATA 5Ø555542Ø594F55522Ø49 4
    E495449414C532Ø5749 5448Ø4
    A4F5953544943        :REM*21
3Ø1 DATA 4BØØØØØØØØØØØØØØØØDØD Ø
    DØDØDØDØDØDØDØDØDØD ØDØDØDØ
    DØDØDØDØD2Ø2Ø        :REM*58
3Ø2 DATA 2Ø2Ø2Ø2Ø594F552Ø4841 5
    6452Ø4D41444520544 8 452Ø544
    F5Ø2Ø54454E21        :REM*2Ø8
3Ø3 DATA ØØØDØDØDØDØDØDØDØD Ø
    DØDØDØDØDØDØDØDØDØD ØD2Ø2Ø2
    Ø2Ø2Ø2Ø2Ø2Ø2Ø        :REM*183
3Ø4 DATA 2Ø2Ø2Ø2Ø4E4F542Ø4F4E 2
    Ø544F5Ø2Ø54454EØØØØ ØØØØBØ7
    BBØ7BBØ7BØØ6D        :REM*64
3Ø5 DATA ØØ1D3637383920 3A3B3C 3
    DØØ2533343524ØØ2622 2724ØØ2
    124232421ØØ21        :REM*174
3Ø6 DATA 22232425ØØ3222253334 3
    524ØØB1FD91FBC8ØØØØ ØØØØØØØ
    ØØØØØØØØ13ØØ        :REM*61
3Ø7 DATA 14ØØ3C99ØØØØ18ØØØØØØ Ø
    ØØ4Ø46Ø14Ø4Ø4ØØØ4Ø4 ØØØ1Ø1Ø
    2ØØØ13ØØ14ØØ        :REM*151
3Ø8 DATA 3C99ØØØØ18ØØØØØØØØ4 Ø
    46Ø14Ø4Ø4ØØØ4Ø4ØØØ1 Ø1Ø2FFØ
    Ø                    :REM*95
3Ø9 DATA -1              :REM*167
```

Listing 2. Hi-Score program.

```
1Ø A$=CHR$(34):PRINT"{SHFT CLR}
   {CTRL 9}{4 SPACEs}HI-SCORE F
   OR RUBBER BANDIT BALL{5 SPAC
   Es}"                  :REM*1Ø5
2Ø PRINT"{CRSR DN}THIS PROGRAM
   GENERATES THE HIGH SCORE"
                         :REM*167
3Ø PRINT"FILE ONTO WHATEVER DIS
   K YOU USE WITH"       :REM*117
4Ø PRINT"THE GAME RUBBER BANDIT
    BALL."               :REM*24
5Ø PRINT"{CRSR DN}USE THIS PROG
   RAM WHENEVER YOU WISH"
                         :REM*253
6Ø PRINT"TO CLEAR THE HI-SCORE
   FILE."                :REM*13
7Ø PRINT"BE SURE TO SCRATCH THE
    FILE CALLED"         :REM*168
8Ø PRINTA$"TOPTEN.O"A$" THEN RU
   N THIS PROGRAM."      :REM*82
9Ø PRINT"THIS PROGRAM MUST BE R
   UN AT LEAST ONCE"     :REM*2
1ØØ PRINT"BEFORE USING RUBBER B
    ANDIT BALL."         :REM*9Ø
11Ø FORX=6*4Ø96TO6*4Ø96+59
                         :REM*29
12Ø READA:C=C+1:IFC=6THEN C=Ø:R
    ESTORE               :REM*246
13Ø POKEX,A:NEXT         :REM*12Ø
14Ø DATA 1,1,1,Ø,Ø,Ø     :REM*241
15Ø OPEN1,8,1,"Ø:TOPTEN.O"
                         :REM*21
16Ø POKE78Ø,253          :REM*4Ø
17Ø POKE253,Ø:POKE254,96:REM*74
18Ø POKE781,6Ø:POKE782,96:REM*3
19Ø SYS 65496:CLOSE1:END
                         :REM*19Ø
```

■

AUTHORS WANTED!

RUN IS ALWAYS on the lookout for programs and articles that contain interesting and useful ideas. For the most part, those ideas come from you, our readers. We rely on you to keep our files well stocked with articles and programs from which to choose.

What kinds of articles do we need? We are looking for programs—of all kinds, shapes, sizes and colors. We need useful applications for the home, small business and school. We need utilities, programmers aids, creativity software and games.

We are sure many of you have developed unique programs that you use every day. You may not realize that a whole community of users is waiting to read about and share your creations.

If you are not a programmer, don't despair. We still need you. The introduction of new Commodore products—GEOS, the 1351 mouse, the 17xx series of RAM expanders and the 1581 drive—has opened up a vast area of topics for you to write about. What commercial software packages do you use that support these devices? What are their strengths and weaknesses? Users and potential users need to know.

These are just suggestions; we're sure you can think of more. Consider this an invitation to share your knowledge and computing experiences with tens of thousands of other Commodore users. And you will be rewarded for your efforts.

To help you submit those articles and programs for publication, we provide the *RUN* author's guidelines. These information sheets give you an idea of what kinds of material we are looking for and take you step by step through the process of preparing your articles for submission.

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Author Guidelines
RUN Magazine
80 Elm Street
Peterborough, NH 03458

RUN AMOK

We regret, and herewith correct, a + that should have been = and a printout of a listing that contained errors.

Item: In the answer to the first question of Commodore Clinic of June 1988 (p. 76), the plus sign in line 70 of the listing should be an equals sign.

Item: In the July 1988 issue, an error was made in printing out the listing for Travel Tally, by Kenny Lawson (p. 70). The complete listing follows:

Listing 1. Travel Expense Diary program.

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1Ø REM BUSINESS TRIP BY KENNY L
   AWSON                  :REM*21Ø
2Ø FORX=1TO1Ø:READA$:CN$(X)=A$:
   NEXT                   :REM*93
3Ø FORX=828TO935:READA:POKEX,A:
   NEXT                   :REM*12
4Ø W1$="{CTRL 7}{CTRL 9}{29 SPA
   CEs}":W2$=W1$+"{CTRL 9}{CTRL
    1} "                  :REM*1Ø6
5Ø W3$="{CTRL 1}"+RIGHT$(W1$,3Ø
   ):MM$="{3 SPACEs}"+CHR$(18)+
   CHR$(129)+MID$(W1$,3,18)+"{C
   TRL Ø}{3 SPACEs}"      :REM*165
6Ø W4$="{CTRL 5}{CTRL 9}{21 SPA
   CEs}":W5$=W4$+"{CTRL 9}{CTRL
    1} ":DY=Ø:FI$="EXPENSE.SQ"
                          :REM*57
7Ø W6$=LEFT$(W3$,23):CH$="{CTRL
    9}{CRSR RT}CHOOSE{CRSR RT}A
   N{CRSR RT}OPTION":SV=Ø:DIMZ$
   (23)                   :REM*179
8Ø FORX=1TO1Ø:FORC=1TO16-LEN(CN
   $(X)):CN$(X)=CN$(X)+CHR$(32)
   :NEXTC                 :REM*2Ø1
9Ø CN$(X)=CHR$(32)+CN$(X):NEXTX
   :DL$="{31 COMD @s}"    :REM*216
1ØØ L1$="{2 COMD Ps}{CTRL Ø}":L
   2$="{2 COMD Os}{CTRL Ø}":L3
   $="{2 COMD Is}{CTRL Ø}":L4$
   ="{CTRL 9}{2 COMD Us}{CTRL
   Ø}":L5$="{CTRL 9}{2 COMD Ys
   }{CTRL Ø}"             :REM*235
11Ø BC$="{CTRL 9}{2 SPACEs}{CTR
   L Ø}{CRSR UP}{2 CRSR LFs}":
   TA$="{21 SPACEs}"      :REM*9Ø
12Ø TA(1)=9:FORX=2TO1Ø:TA(X)=TA
   (X-1)+3:NEXT           :REM*46
13Ø CO$(1)="{CTRL 3}":CO$(2)="{
   CTRL 5}":CO$(3)="{CTRL 6}":
   CO$(4)="{CTRL 7}":CO$(5)="{
   COMD 7}"               :REM*129
14Ø CO$(6)="{COMD 1}":CO$(7)="{
   COMD 2}":CO$(8)="{COMD 6}":
   CO$(9)="{COMD 3}":CO$(1Ø)="
   {COMD 4}"              :REM*1Ø1
15Ø OPEN15,8,15:OPEN8,8,8,FI$+"
   ,S,R":INPUT#15,ER$:BB$="Ø":
   ED=Ø                   :REM*12
16Ø IFVAL(ER$)<19THENCLOSE8:CLO
   SE15:GOTO19Ø           :REM*179
17Ø PRINT#15,"UJ":FORX=1TO2ØØØ:
   NEXT:CLOSE15           :REM*113
18Ø CLOSE8:OPEN8,8,8,FI$+",S,W"
   :FORX=1TO1Ø:PRINT#8,BB$:NEX
   T:CLOSE8:CLOSE15       :REM*83
19Ø PRINTCHR$(3Ø)CHR$(147):POKE
   5328Ø,15:POKE53281,15
                          :REM*252
2ØØ PRINT"{HOME}{COMD 1}{SHFT O
   }{COMD H}"TAB(37)"{COMD N}{
   SHFT P}"               :REM*88
21Ø PRINT"{SHFT P}{37 COMD Ys}{
   SHFT O}"               :REM*2Ø4
22Ø FORX=1TO2Ø:PRINT"{COMD M}"T
   AB(38)"{COMD H}":NEXT
                          :REM*33
23Ø PRINT"{SHFT @}{37 COMD Ps}{
   SHFT L}"               :REM*245
24Ø PRINT"{SHFT L}{COMD H}"TAB(
   37)"{COMD N}{SHFT @}";
                          :REM*127
25Ø PRINTCHR$(19):PRINT:PRINT:P
   RINT"{COMD 1}{4 CRSR RTs}{C
   TRL 9}BUSINESS DIARY AND EX
   PENSE CHART{2 CRSR DNs}"
                          :REM*129
26Ø PRINTTAB(8)MM$:PRINTTAB(8)"
   {3 SPACEs}{CTRL 9}{4 SPACEs
   }MAIN{2 SPACEs}MENU{4 SPACE
   s}{CTRL Ø}{3 SPACEs}"
                          :REM*18
27Ø FORX=1TO2:PRINTTAB(8)MM$:NE
   XT:PRINTTAB(8)"{3 SPACEs}{C
   TRL 9} 1. LOAD THE FILE {CT
   RL Ø}{3 SPACEs}"       :REM*191
28Ø PRINTTAB(8)"{3 SPACEs}{CTRL
    9} 2. SAVE THE FILE {CTRL
   Ø}{3 SPACEs}"          :REM*238
29Ø PRINTTAB(8)"{3 SPACEs}{CTRL
    9} 3. ENTER AMOUNTS {CTRL
   Ø}{3 SPACEs}"          :REM*33
3ØØ PRINTTAB(8)"{3 SPACEs}{CTRL
    9} 4. SEE BAR CHART {CTRL
   Ø}{3 SPACEs}"          :REM*2Ø1
31Ø PRINTTAB(8)"{3 SPACEs}{CTRL
    9} 5. CHECK TOTALS{2 SPACE
   s}{CTRL Ø}{3 SPACEs}"
                          :REM*35
32Ø PRINTTAB(8)"{3 SPACEs}{CTRL
    9} 6. EXIT PROGRAM{2 SPACE
   s}{CTRL Ø}{3 SPACEs}"
                          :REM*122
33Ø FORX=1TO4:PRINTTAB(8)MM$:NE
   XT:PRINT"{3 CRSR UPs}"
                          :REM*2Ø1
34Ø PRINTTAB(11)CH$:GETA$
                          :REM*198
35Ø IFA$<>""THEN37Ø       :REM*29
36Ø FORX=1TO3ØØ:NEXT:PRINT"{2 C
   RSR UPs}":PRINTTAB(8)MM$"{C
   RSR UP}":FORX=1TO3ØØ:NEXT:G
   OTO34Ø                 :REM*16Ø
37Ø A=VAL(A$):IFA<1ORA>6THEN36Ø
                          :REM*1Ø1
38Ø ONAGOTO69Ø,79Ø,4ØØ,11ØØ,156
   Ø,167Ø                 :REM*89
39Ø REM GET CATEGORY INPUTS
                          :REM*131
4ØØ POKE5328Ø,14:POKE53281,14:P
   RINTCHR$(159)CHR$(147)CHR$(
   17)                    :REM*27
41Ø A$=CHR$(18)+CHR$(32):PRINTT
   AB(11);:FORX=1TO19:PRINTA$;
   :NEXT:PRINT            :REM*218
42Ø FORX=1TO21:PRINTTAB(11)A$SP
   C(17)A$:NEXT           :REM*5
43Ø PRINTTAB(11);:FORX=1TO19:PR
   INTA$;:NEXT:PRINTCHR$(19):F
   ORX=1TO3:PRINT:NEXT:REM*184
44Ø FORX=1TO1Ø:PRINTTAB(12)CN$(
   X)CHR$(17):NEXT        :REM*252
45Ø PRINT"{HOME}{3 CRSR DNs}":P
   RINTTAB(12)CHR$(18)CN$(1)
                          :REM*61
46Ø PRINT"{HOME}{3 CRSR DNs}"TA
   B(32)"USE THE{CRSR DN}"
                          :REM*251
47Ø PRINT" BUSINESS"TAB(32)"CUR
   SOR{CRSR DN}":PRINT"{2 SPAC
   Es}DIARY"TAB(32)"KEYS TO{CR
   SR DN}"                :REM*79
48Ø PRINT"{3 SPACEs}AND"TAB(32)
   "MOVE{CRSR DN}":PRINT" EXPE
   NSE":PRINTTAB(32)"RETURN"
                          :REM*118
49Ø PRINT"{2 SPACEs}CHART":PRIN
   TTAB(34)"TO{CRSR DN}":PRINT
   TAB(32)"SELECT{2 CRSR DNs}"
                          :REM*43
5ØØ PRINTTAB(32)"<M> FOR{CRSR D
   N}":PRINTTAB(33)"MENU":POKE
   214,3:PRINT            :REM*131
51Ø GETA$:IFA$=""THEN51Ø
                          :REM*17Ø
52Ø IFA$="M"THEN19Ø       :REM*254
53Ø IFA$<>CHR$(17)THEN59Ø
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                              :REM*238
540 GOSUB870:IFCN=10THEN570
                              :REM*157
550 PRINT:PRINTCHR$(145)TAB(12)
    CN$(CN)CHR$(17)           :REM*201
560 PRINTTAB(12)CHR$(18)CN$(CN+
    1);:GOTO510               :REM*58
570 PRINT:PRINTCHR$(145)TAB(12)
    CN$(CN):POKE214,3:PRINT:PRI
    NTTAB(12)"{CTRL 9}"CN$(1);
                              :REM*219
580 GOTO510                   :REM*142
590 IFA$<>CHR$(145)THEN650
                              :REM*100
600 GOSUB870:IFCN=1THEN630
                              :REM*95
610 PRINT:PRINTCHR$(145)TAB(12)
    CN$(CN):POKE214,SN-3:PRINT
                              :REM*50
620 PRINTTAB(12)CHR$(18)CN$(CN-
    1);:GOTO510               :REM*233
630 PRINT:PRINTCHR$(145)TAB(12)
    CN$(1):POKE214,21:PRINT
                              :REM*110
640 PRINTTAB(12)CHR$(18)CN$(10)
    ;:GOTO510                 :REM*203
650 IFA$<>CHR$(13)THEN510
                              :REM*154
660 GOSUB870:RO=PEEK(214):SYS82
    8:REM SAVE SCREEN         :REM*97
670 GOSUB980:REM INPUT ROUTINE
                              :REM*132
680 GOTO510                   :REM*234
690 REM LOAD FILE             :REM*129
700 GOSUB770:REM DRAW WINDOW
                              :REM*183
710 PRINTTAB(9)"{CTRL 5}{CTRL 9
    }{CRSR UP}{CRSR RT}LOADING{
    2 CRSR RTs}"FI$:GOSUB1410:R
    EM READ DISK STATUS:REM*133
720 CLOSE8:OPEN8,8,8,"EXPENSE.S
    Q,S,R"                    :REM*169
730 FORX=1TO10:INPUT#8,CS$(X):C
    N(X)=VAL(CS$(X)):NEXT:CLOSE
    8                         :REM*111
740 FORX=1TO10:IFCN(X)<>0THENDY
    =1                        :REM*64
750 NEXT                      :REM*115
760 GOSUB1410:GOTO250         :REM*143
770 PRINT"{HOME}{10 CRSR DNs}":
    PRINTTAB(9)W4$:FORX=1TO3:PR
    INTTAB(9)W5$:NEXT         :REM*24
780 PRINTTAB(10)W6$"{4 CRSR UPs
    }":RETURN                 :REM*36
790 REM SAVE FILE             :REM*63
800 OPEN15,8,15,"S0:BUS.SEQ.DEL
    "                         :REM*193
810 GOSUB770:PRINTTAB(10)"{CTRL
     9}{CTRL 5}{CRSR UP}SAVING{
    2 CRSR RTs}"FI$           :REM*76
820 GOSUB1410:OPEN15,8,15,"R0:B
    US.SEQ.DEL="+FI$          :REM*78
830 GOSUB1410:OPEN15,8,15,"S0:"
    +FI$                      :REM*209
840 GOSUB1410:CLOSE8:OPEN8,8,8,
    FI$+",S,W"                :REM*132
850 FORX=1TO10:CS$(X)=STR$(CN(X
    )):PRINT#8,CS$(X):NEXT
                              :REM*169
860 GOSUB1410:SV=1:GOTO250
                              :REM*100
870 REM CHECK PEEK            :REM*56
880 SN=PEEK(214):IFSN=4THENCN=1
    :RETURN                   :REM*116
890 IFSN=6THENCN=2:RETURN
                              :REM*212
900 IFSN=8THENCN=3:RETURN
                              :REM*55
910 IFSN=10THENCN=4:RETURN
                              :REM*44
920 IFSN=12THENCN=5:RETURN
                              :REM*11
930 IFSN=14THENCN=6:RETURN
                              :REM*106
940 IFSN=16THENCN=7:RETURN
                              :REM*73
950 IFSN=18THENCN=8:RETURN
                              :REM*168
960 IFSN=20THENCN=9:RETURN
                              :REM*94
970 CN=10:RETURN              :REM*188
980 REM INPUT ROUTINE         :REM*39
990 GOSUB1470:TP$="":PRINTCHR$(
    31);                      :REM*216
1000 POKE204,0:GETD$:IFD$=""THE
     N1000                    :REM*83
1010 IFD$="."THEN1050         :REM*37
1020 IFD$=CHR$(13)THEN1050
                              :REM*137
1030 IFD$>"/"ANDD$<":"THEN1050
                              :REM*144
1040 WAIT207,1:POKE204,1:GOSUB1
     790:GOSUB1510:GOTO990
                              :REM*156
1050 IFD$<>CHR$(13)THENTP$=TP$+
     D$:PRINTD$;:GOTO1000
                              :REM*104
1060 WAIT207,1:POKE204,1:REM*88
1070 CN(CN)=CN(CN)+VAL(TP$):PRI
     NTCHR$(159):IFCN(CN)<>0THE
     NDY=1                    :REM*65
1080 SYS882:POKE214,RO-1:PRINT:
     IFTP$<>""THENED=1        :REM*124
1090 RETURN                   :REM*212
1100 REM DRAW BAR CHART       :REM*26
1110 IFDYTHEN1140             :REM*25
1120 GOSUB1790:GOSUB770:PRINTTA
     B(9)"{CTRL 9}{CTRL 5}NO DA
     TA IN CATEGORIES"        :REM*97
1130 FORX=1TO2000:NEXT:GOTO250
                              :REM*152
1140 POKE53280,0:POKE53281,0:PR
     INTCHR$(30)CHR$(147);
                              :REM*145
1150 HI=0:FORX=1TO10:IFCN(X)>HI
     THENHI=INT(CN(X))        :REM*8
1160 NEXT                     :REM*15
1170 IFHI/20<>INT(HI/20)THENHI=
     HI+1:GOTO1170            :REM*55
1180 IN=INT(HI/20):SA=HI-IN
                              :REM*51
1190 FORX=SATO0STEP-IN:PRINT"$
     "X;TAB(8)DL$:NEXT        :REM*214
1200 PRINTTAB(9)"D{2 SPACEs}E{2
      SPACEs}H{2 SPACEs}M{2 SPA
     CEs}P{2 SPACEs}S{2 SPACEs}
     T{2 SPACEs}G{2 SPACEs}T{2
     SPACEs}V"                :REM*251
1210 PRINT"CATEGORY I{2 SPACEs}
     N{2 SPACEs}T{2 SPACEs}S{2
     SPACEs}H{2 SPACEs}U{2 SPAC
     Es}A{2 SPACEs}R{2 SPACEs}R
     {2 SPACEs}M"             :REM*249
1220 PRINTTAB(9)"N{2 SPACEs}T{2
      SPACEs}L{2 SPACEs}C{2 SPA
     CEs}O{2 SPACEs}P{2 SPACEs}
     X{2 SPACEs}A{2 SPACEs}A{2
     SPACEs}T{CRSR DN}"       :REM*33
1230 PRINT"{CTRL 9}{9 SPACEs}WO
     RKING....PLEASE WAIT{8 SPA
     CEs}{HOME}"              :REM*147
1240 PN=IN/6:FORX=1TO10:CH(X)=I
     NT(CN(X)/IN):CL(X)=CN(X)-C
     H(X)*IN                  :REM*176
1250 IFCL(X)=0THENPB$(X)="":GOT
     O1320                    :REM*35
1260 IFCL(X)<PNTHENPB$(X)=L1$:
     GOTO1320                 :REM*48
1270 IFCL(X)<PN*2THENPB$(X)=L2
     $:GOTO1320               :REM*101
1280 IFCL(X)<PN*3THENPB$(X)=L3
     $:GOTO1320               :REM*136
1290 IFCL(X)<PN*4THENPB$(X)=L4
     $:GOTO1320               :REM*188
1300 IFCL(X)<PN*5THENPB$(X)=L5
     $:GOTO1320               :REM*224
1310 CH(X)=CH(X)+1            :REM*198
1320 NEXT                     :REM*175
1330 FORX=1TO10:LT=0:POKE214,18
     :PRINT:PRINTTAB(TA(X));
                              :REM*55
1340 IFCH(X)=0THEN1360        :REM*220
1350 FORCT=1TOCH(X):PRINTCO$(X)
     BC$;:NEXT                :REM*248
1360 PRINTCO$(X)PB$(X):NEXT
                              :REM*240
1370 POKE214,23:PRINT:PRINT"{CT
     RL 9}{4 SPACEs}WOULD YOU L
     IKE A PRINTOUT? (Y/N){3 SP
     ACEs}{HOME}"             :REM*91 ►
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138Ø GETA$:IFA$="Y"THEN185Ø
                        :REM*11Ø
139Ø IFA$<>"N"THEN138Ø  :REM*16
14ØØ GOTO19Ø            :REM*2Ø1
141Ø REM CHECK DISK STATUS
                        :REM*13
142Ø CLOSE15:OPEN15,8,15:INPUT#
     15,V$,W$,X$,Y$     :REM*249
143Ø IFVAL(V$)<19THENCLOSE15:RE
     TURN               :REM*69
144Ø GOSUB179Ø          :REM*1
145Ø PRINTTAB(1Ø)"{CTRL 5}{CTRL
      9}{CRSR DN}DISK{CRSR RT}E
     RROR{CRSR RT}:":PRINTTAB(1
     Ø)"{CTRL 9}"W$:FORX=1TO2ØØ
     Ø:NEXT             :REM*155
146Ø PRINT#15,"UJ":FORX=1TO1ØØØ
     :NEXT:CLOSE15:GOTO25Ø
                        :REM*199
147Ø REM DRAW WINDOW 1  :REM*98
148Ø PRINT"{HOME}{9 CRSR DNs}":
     PRINTTAB(5)W1$:FORX=1TO6:P
     RINTTAB(5)W2$:NEXT:REM*235
149Ø PRINTTAB(6)W3$"{7 CRSR UPs
     }{CTRL 7}":PRINTTAB(6)"{CT
     RL 9}ENTER{CRSR RT}TODAY'S
     {CRSR RT}TOTAL{CRSR RT}AMO
     UNT{CRSR DN}"      :REM*139
15ØØ PRINTTAB(6)"{CTRL 9}FOR"CN
     $(CN):PRINTCHR$(17)TAB(8)"
     {CTRL 9}${CRSR RT}{CTRL 2}
     ";:RETURN          :REM*133
151Ø REM DRAW WINDOW 2 :REM*174
152Ø PRINT"{HOME}{1Ø CRSR DNs}"
     :PRINTTAB(9)W4$:FORX=1TO3:
     PRINTTAB(9)W5$:NEXT:REM*37
153Ø PRINTTAB(1Ø)W6$"{5 CRSR UP
     s}{CTRL 5}":PRINTTAB(1Ø)"{
     CTRL 9}USE{CRSR RT}ONLY{CR
     SR RT}NUMBERS{CRSR RT}OR"
                        :REM*72
154Ø PRINTTAB(11)"{CTRL 9}DECIM
     AL{CRSR RT}POINT{CRSR RT}(
     .){CRSR DN}"       :REM*87
155Ø PRINTTAB(1Ø)"{CTRL 9}RE-EN
     TER{CRSR RT}THE{CRSR RT}AM
     OUNT":FORX=1TO25ØØ:NEXT:RE
     TURN               :REM*22
156Ø REM DISPLAY TOTALS:REM*115
157Ø POKE53281,5:POKE5328Ø,5:PO
     KE646,13:PRINTCHR$(147):GT
     =Ø                 :REM*168
158Ø FORX=1TO1Ø:PRINTTAB(5)CN$(
     X)TAB(25)"$";:GOSUB163Ø:GT
     =GT+CN(X)          :REM*1ØØ
159Ø PRINTSPC(9-LE)LE$:PRINT:NE
     XT                 :REM*177
16ØØ PRINT"{2 CRSR DNs}TOTAL EX
     PENSES= $";:LE$=STR$(GT):L
     E=LEN(LE$):GOSUB164Ø
                        :REM*21Ø
161Ø PRINTLE$TAB(26)"{CTRL 9}PR
     ESS ANY KEY{CTRL Ø}";:POKE
     198,Ø              :REM*197
162Ø WAIT198,1:POKE198,Ø:GOTO19
     Ø                  :REM*91
163Ø LE$=STR$(CN(X)):LE=LEN(LE$
     )                  :REM*2Ø9
164Ø IFMID$(LE$,LE-1,1)="."THEN
     LE$=LE$+"Ø":LE=LE+1
                        :REM*1Ø7
165Ø IFVAL(LE$)=INT(VAL(LE$))TH
     ENLE$=LE$+".ØØ":LE=LE+3
                        :REM*137
166Ø RETURN             :REM*13
167Ø REM EXIT PROGRAM   :REM*1
168Ø GOSUB179Ø:GOSUB77Ø:PRINTTA
     B(1Ø)"{CTRL 9}{CTRL 5}QUIT
     ? ARE YOU SURE?"   :REM*22
169Ø PRINTTAB(17)"{CTRL 9}(Y/N)
     ":POKE198,Ø        :REM*63
17ØØ GETA$:IFA$="N"THEN25Ø
                        :REM*133
171Ø IFA$<>"Y"THEN17ØØ :REM*168
172Ø IFSV=1ORED=ØTHEN177Ø
                        :REM*44
173Ø GOSUB179Ø:GOSUB77Ø:PRINTTA
     B(11)"{CTRL 5}{CTRL 9}CHAN
     GES NOT SAVED":POKE198,Ø
                        :REM*244
174Ø PRINTTAB(11)"{CTRL 9}STILL
      QUIT? (Y/N)"      :REM*162
175Ø GETA$:IFA$="N"THEN25Ø
                        :REM*247
176Ø IFA$<>"Y"THEN175Ø :REM*214
177Ø POKE5328Ø,14:POKE53281,6:P
     OKE646,14:PRINTCHR$(147)
                        :REM*1Ø4
178Ø POKE198,2:POKE631,32:POKE6
     32,2Ø:END          :REM*155
179Ø REM WARNING NOISE  :REM*26
18ØØ VV=54272:POKEVV+23,Ø:POKEV
     V+24,15            :REM*1Ø4
181Ø POKEVV+6,Ø:POKEVV+5,12:POK
     EVV+1,9Ø           :REM*52
182Ø POKEVV+3,18Ø:FORBB=1TO5:PO
     KEVV+4,Ø           :REM*235
183Ø POKEVV+4,65:FORCC=1TO23Ø:N
     EXT:NEXT           :REM*174
184Ø POKEVV+4,Ø:POKEVV+24,Ø:RET
     URN                :REM*84
185Ø REM{6 SPACEs}HARDCOPY DUMP
                        :REM*44
186Ø CLOSE15:OPEN15,4,15:CLOSE1
     5:IFST=ØTHEN189Ø   :REM*152
187Ø POKE214,23:PRINT:PRINT"{CT
     RL 9}{4 SPACEs}TURN ON PRI
     NTER AND HIT ANY KEY{4 SPA
     CEs}";             :REM*2Ø4
188Ø WAIT198,1:POKE198,Ø:GOTO18
     6Ø                 :REM*111
189Ø POKE214,23:PRINT:PRINT"{CT
     RL 9}POSITION PAPER TO TOP
      OF FORM & HIT KEY";
                        :REM*17
19ØØ WAIT198,1:POKE198,Ø:FORX=1
     TO1Ø:CS$(X)=STR$(CN(X)):NE
     XT                 :REM*117
191Ø POKE214,23:PRINT:PRINT"{CT
     RL 9}{6 SPACEs}WORKING . .
      . PLEASE WAIT{8 SPACEs}{H
     OME}"              :REM*194
192Ø SA=1Ø24:FORZ=1TO23:REM*163
193Ø FORX=ØTO39:C=PEEK(SA+X)
                        :REM*143
194Ø IFC=16ØTHENZ$(Z)=Z$(Z)+CHR
     $(18)+CHR$(32)+CHR$(146):N
     EXT                :REM*233
195Ø IFC=1ØØTHENC=164   :REM*17
196Ø IFC=111THENC=175   :REM*125
197Ø IFC=121THENC=185   :REM*87
198Ø IFC=98THENC=162    :REM*55
199Ø IFC=247THENZ$(Z)=Z$(Z)+CHR
     $(18)+CHR$(183)+CHR$(146):
     NEXT               :REM*251
2ØØØ IFC=248THENZ$(Z)=Z$(Z)+CHR
     $(18)+CHR$(184)+CHR$(146):
     NEXT               :REM*4
2Ø1Ø IFC<26THENC=C+64   :REM*2Ø7
2Ø2Ø Z$(Z)=Z$(Z)+CHR$(C):NEXTX:
     SA=SA+4Ø:NEXTZ     :REM*25
2Ø3Ø CLOSE4:OPEN4,4:FORX=1TO1Ø:
     PRINT#4:NEXT       :REM*171
2Ø4Ø PRINT#4,SPC(18)CHR$(14)"BU
     SINESS TRIP EXPENSES"CHR$(
     15)                :REM*255
2Ø5Ø FORX=1TO6:PRINT#4:NEXT:FOR
     X=1TO2Ø:PRINT#4,CHR$(15)SP
     C(2Ø)Z$(X)CHR$(8):NEXT
                        :REM*Ø
2Ø6Ø PRINT#4:PRINT#4,CHR$(15):F
     ORX=21TO23:PRINT#4,SPC(2Ø)
     Z$(X):NEXT         :REM*62
2Ø7Ø FORGG=1TO5:PRINT#4:NEXT:FO
     RX=1TO1Ø:WW$(X)=CS$(X)
                        :REM*127
2Ø8Ø LE$=WW$(X):LE=LEN(WW$(X)):
     GOSUB164Ø:WW$(X)=LE$
                        :REM*168
2Ø9Ø PRINT#4,TA$CN$(X)SPC(24-LE
     N(CN$(X)))"$"SPC(1Ø-LEN(WW
     $(X)))WW$(X)       :REM*224
21ØØ NEXT:PRINT#4:GT=Ø:FORX=1TO
     1Ø:GT=GT+VAL(WW$(X)):NEXT
                        :REM*222
211Ø PRINT#4:PRINT#4    :REM*93
212Ø LE$=STR$(GT):LE=LEN(LE$):G
     OSUB164Ø           :REM*238
213Ø PRINT#4,TA$" TOTAL EXPENSE
     S ="SPC(7)"$"SPC(1Ø-LEN(LE
     $))LE$             :REM*23
214Ø PRINT#4:CLOSE4:GOTO19Ø
                        :REM*1Ø
215Ø DATA DINING COSTS,ENTERTAI
     NMENT,HOTEL COSTS,MISCELLA
     NEOUS,PHONE COSTS  :REM*24Ø
216Ø DATA SUPPLIES,TAXES PAID,G
     RATUITIES,TRANSPORTATION,V
     EHICLE MAINT.      :REM*73
217Ø DATA 162,Ø,189,Ø,4,157,Ø,1
     92,189,Ø,5,157,Ø,193,189,Ø
     ,6,157,Ø,194       :REM*17
218Ø DATA 189,Ø,7,157,Ø,195,189
     ,Ø,216,157,Ø,196,189,Ø,217
     ,157,Ø,197         :REM*22Ø
219Ø DATA 189,Ø,218,157,Ø,198,1
     89,Ø,219,157,Ø,199,232,2Ø8
     ,2Ø5,96            :REM*39
22ØØ DATA 162,Ø,189,Ø,192,157,Ø
     ,4,189,Ø,193,157,Ø,5,189,Ø
     ,194,157,Ø,6       :REM*148
221Ø DATA 189,Ø,195,157,Ø,7,189
     ,Ø,196,157,Ø,216,189,Ø,197
     ,157,Ø,217         :REM*191
222Ø DATA 189,Ø,198,157,Ø,218,1
     89,Ø,199,157,Ø,219,232,2Ø8
     ,2Ø5,96            :REM*144 ■
```

From p. 12.

```
    :PRINT#4,SPC(K)B$(I):NEXT:CLOSE4
                                    :REM*249
13Ø END                             :REM*3
```

—JOHN E. MILLER, HAVERHILL, OH

$4CE HI-TECH LOOK ON A LO-TECH BUDGET

If you've priced monitor and printer stands recently, you know they're outrageously expensive. So do what I did—make your own! Buy a grid chair or two (they're about $5 each) at your local department store and shorten the legs with a hacksaw to a height of four or five inches, so a computer and peripherals will fit under the seat. Place the four rubber feet from the feet of the chair onto the legs of the chair. Saw off the back of the chair, but leave the armrests on to hold the monitor or printer in place.

—BEAU BEAUHARNOIS, PLATTSBURG, NY

$4CF THE DELETER

If you need to delete blocks of lines from a C-64 Basic program, append The Deleter to it to do the job for you.

In the lines beginning at 63000 in the listing below, FL is the first line number of the block you want to delete, and LL is the last line. As you can see, FL and LL have the value of 10 and 40, respectively, which are the first four lines in the listing. As a demonstration, if you run this program as listed, it will delete those lines. When you're ready to run The Deleter, enter RUN 63000 to delete lines.

(Note: If you don't have a program-append utility, you can just list this program to the screen and load in the program you want to append. Then position the cursor over each line of The Deleter from lines 63000 through 63060, and press return. You'll find The Deleter appended to the end of your program.)

```
Ø REM THE DELETER - ROLF MILLER     :REM*56
1Ø REM                              :REM*153
2Ø REM                              :REM*163
3Ø REM                              :REM*173
4Ø REM                              :REM*183
63ØØØ REM ENTER 'RUN 63ØØØ' TO DELETE LINE
      S                             :REM*78
63Ø1Ø FL=1Ø:GOTO 63Ø4Ø:REM MAKE FL = THE F
      IRST LINE TO DELETE           :REM*123
63Ø2Ø LL=4Ø: REM MAKE LL = THE LAST LINE T
      O DELETE                      :REM*99
63Ø3Ø FL=PEEK(82Ø)+PEEK(821)*256:IF FL>LL
      THEN END                      :REM*225
63Ø4Ø PRINTCHR$(147):POKE 646,PEEK(53281):
      POKE 198,3:FORX= Ø TO 2:POKE 631+X,1
      3                             :REM*157
63Ø5Ø PRINTFL:NEXT:FL=FL+1:H%=FL/256:L%=FL
      -H%*256                       :REM*6Ø
63Ø6Ø POKE 82Ø,L%:POKE 821,H%:PRINT"{COMD
      7}RUN 63Ø2Ø"CHR$(19):END      :REM*229
```

—ROLF MILLER, VENTURA, CA

$4DO BYTE CALCULATOR

Programmers who work with bit values to form bytes, such as when editing sprites, usually use a calculator to figure bit combinations. Byte Calculator performs the calculations for you. When the program asks you which bits are on, enter the bit numbers in any order. It will then display the bits you input followed by the value of the byte created by that set of bits.

```
Ø REM BYTE CALCULATOR - SISTER ANNE STREML
  AU                                :REM*234
1Ø INPUT"WHICH BITS ARE ON";BO$     :REM*74
2Ø BY=Ø:FORX=1 TO LEN(BO$)          :REM*15Ø
3Ø AS=ASC(MID$(BO$,X,1))            :REM*2Ø9
4Ø IF AS<48 OR AS>55 THEN PRINT"INVALID BI
   T #, TRY AGAIN":GOTO 1Ø          :REM*91
5Ø EX=VAL(MID$(BO$,X,1))            :REM*5Ø
6Ø BY=BY+2{UP ARROW}EX              :REM*164
7Ø NEXT                             :REM*2ØØ
79 PRINT"BITS INPUT =";BO$          :REM*167
8Ø PRINT"VALUE OF BYTE =";BY        :REM*195
9Ø GOTO1Ø                           :REM*212
```

—SISTER ANNE STREMLAU, MAUSTON, WI

$4D1 BRIGHTER BORDERS 64

Enhance your screen border display with Brighter Borders, an interrupt-driven program that uses the raster register to give the border a rainbow of colors. Unlike programs of similar design, running a Basic program will not affect these bars of color, making Brighter Borders easy to incorporate into your own programs.

Use POKE 867,251 to scroll the bars downward, and POKE 840,33 to transfer the bars to the inner screen.

```
Ø REM BRIGHT BORDERS - JEFF A. MARTIN
                                    :REM*42
1Ø FORI= 828 TO 953:READA:POKEI,A:B=B+A:NE
   XT                               :REM*22Ø
2Ø IFB<>13466THENPRINT"ERROR IN DATA":END
                                    :REM*144
3Ø SYS874                           :REM*163
4Ø DATA 173,25,2Ø8,141,25,2Ø8,166,25Ø,189,
   154,3,141,32,2Ø8,198,25Ø,2Ø2     :REM*237
5Ø DATA 165,251,24,125,154,3,141,18,2Ø8,19
   8,25Ø,224,Ø,24Ø,6,1Ø4,168,1Ø4     :REM*24
6Ø DATA 17Ø,1Ø4,64,23Ø,252,32,145,3,1Ø8,15
   2,3,173,2Ø,3,141,152,3,173,21     :REM*23Ø
7Ø DATA 3,141,153,3,12Ø,169,6Ø,141,2Ø,3,16
   9,3,141,21,3,88,169,127,141       :REM*2
8Ø DATA 13,22Ø,169,1,141,26,2Ø8,133,251,16
   9,27,141,17,2Ø8,169,31,133        :REM*213
9Ø DATA 25Ø,96,49,234,26,13,1Ø,5,25Ø,3,234
   ,14,218,6,2Ø2,4,186,9,17Ø,2       :REM*195
1ØØ DATA 154,8,138,1Ø,122,7,1Ø6,1,9Ø,15,74
    ,12,58,11,42,Ø                  :REM*138
```

—JEFF A. MARTIN, ROSEVILLE, CA ■

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

RUN *pays $10 to $40 for each trick published. A payment of $50 and a Magic Contributor T-shirt are awarded for the Trick of the Month. For a copy of* RUN*'s Magic Trick Writer's Guide, send your request with a self-addressed, stamped, business-size envelope.*

MEGA-MAGIC

Introduce yourself to the power and speed of the C-64 Kernal.

KRACKING THE KERNAL

Many beginning programmers assume the C-64 Kernal is filled with 6502 subroutines that are as mysterious as hieroglyphics and used exclusively by machine language programmers. While this may be true to some extent, anyone can use Kernal routines to access the power and speed of the built-in ML routines without having to learn machine language.

The Kernal Plot routine lets you position the cursor anywhere on the screen without using a lot of cursor commands. The three routines below show how to use the Plot routine in conjunction with the Kernal's line-clearing, line-insertion and screen-scrolling routines.

Program 1 utilizes both the Kernal Plot routine and the Kernal routine that clears a screen line. This is useful for programs that need to clear only a portion of the video screen. It also clears the screen from the bottom up. To clear the screen from the top down, change line 30 to X = 0:Y = 0, then reverse the logic in line 60. If you want to use just the Plot routine at 65520 ($FFF0), set X = row (0–24) and Y = column (0–39), then place line 100 as a subroutine in your own program.

Program 2 shows how to achieve rapid screen scrolling from Basic by using the Kernal routine at 59626 ($E8EA). This program prints a line of text at the bottom of the screen, then scrolls it to the top.

Finally, program 3 scrolls text down the video screen. The Kernal routine at 59749 ($E965) is a subroutine the Kernal uses to insert a blank line on the screen. You can see this by listing a program, going to a line with fewer than 40 characters, then adding text until the 40-column boundary is crossed. Notice the extra blank line that appears.

Program 3 is called with the invisible cursor positioned at the top of the screen, just above the printed text. When the Insert routine is called, the computer automatically moves everything on the screen down as it adds a blank line.

The Kernal is for everyone who wants to squeeze every ounce of power from his C-64 without having to re-invent the wheel. Grab a memory map and explore the Kernal for yourself. Who knows what little ML gems you'll find for your Basic programs!

—JOHN RYAN, BILOXI, MS Ⓡ

Listing 1. Kernal Plot and Clear Screen routine.

```
5 REM PROGRAM #1                          :REM*7
10 REM KERNAL PLOT AND CLEAR ROUTINE
                                          :REM*117
15 PRINT CHR$(147);"PRESS SPACE BAR"
                                          :REM*81
20 FOR A=1 TO 176:PRINT"DEMO ";:NEXT
                                          :REM*103
30 X=24:Y=0                               :REM*218
40 POKE198,0:WAIT 198,1                   :REM*163
50 GOSUB 100:SYS 59903:REM CLEAR LINE
                                          :REM*246
60 X=X-1:IF X<0 THEN X=24:GOTO15          :REM*170
70 GOTO 40                                :REM*198
90 REM - KERNAL PLOT ROUTINE               :REM*47
100 POKE 781,X:POKE 782,Y:POKE 783,0:SYS 6
    552O:RETURN                           :REM*239
```

Listing 2. Kernal demo for scrolling up.

```
5 REM KERNAL PROG #2                      :REM*12
10 REM KERNAL SCROLL DEMO                 :REM*29
20 PRINT CHR$(147)                        :REM*226
30 J=0:X=24:Y=0:PRINT "PRESS SPACE BAR"
                                          :REM*156
35 GOSUB 100:PRINT"THIS IS DEMO OF SCROLLI
   NG UP THE SCREEN"CHR$(19)              :REM*196
50 POKE198,0:WAIT 198,1                   :REM*213
60 SYS 59626                               :REM*0
70 J=J+1:IF J<>24 THEN 50                 :REM*201
80 GOTO 20                                :REM*204
100 POKE 781,X:POKE 782,Y:POKE 783,0:SYS 6
    552O:RETURN                           :REM*239
```

Listing 3. Insert routine for scrolling down.

```
5 REM KERNAL PROG #3                      :REM*57
10 REM USING INSERT ROUTINE TO SCROLL
                                          :REM*225
20 PRINTCHR$(147)                         :REM*226
30 X=0                                    :REM*104
35 PRINT"PRESS THE SPACE BAR TO SCROLL DOW
   N"                                      :REM*50
40 POKE198,0:WAIT 198,1                   :REM*163
60 PRINT"{HOME}";:SYS 59749               :REM*117
70 X=X+1:IF X<>24 THEN 40                  :REM*80
80 GOTO 20                                :REM*204
```

■

RUN it right: **C-64**

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(4096)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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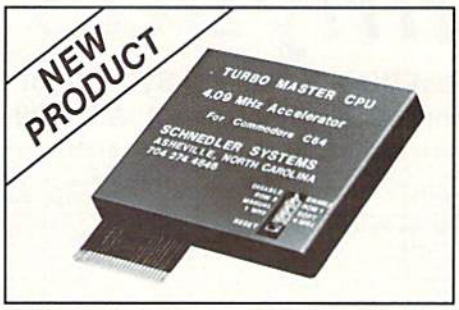
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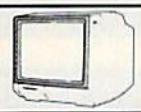
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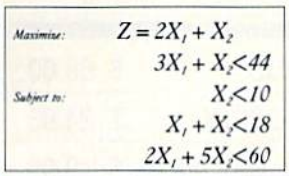
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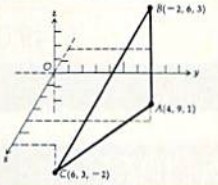
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3 TECHNICAL PROGRAMS



Linear Programmer

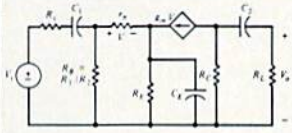
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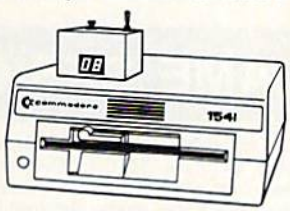
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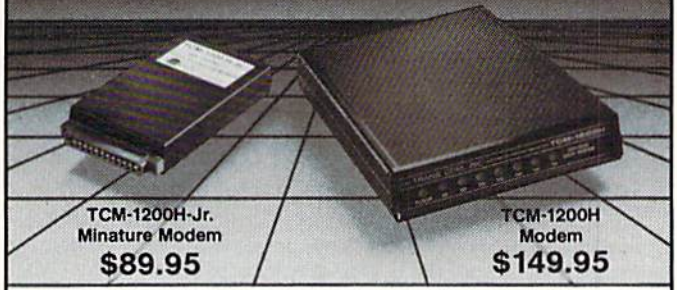
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EDUCATIONAL SOFTWARE—
October is Computer Learning Month, so next month's Software Gallery column is devoted to educational programs to be used by students and teachers in the classroom, or for moms and dads with their kids at home.

TEACHER'S TOOL—
The education theme continues with a program to aid teachers in preparing and grading exams.

PROGRAMMING IN GEOS—
Our geoWatch column will feature a look at getting the most from geoProgrammer. Noted GEOS programmer Bill Coleman gives some basic guidelines to improve your programming efficiency and style.

TRICK OR TREAT!—
Of course, October is also the month when witches take to the sky and young (and old) trick or treaters don their scariest garb. We'll include a festive program that you can type in and display on your computer screen on Halloween.

IN ADDITION—
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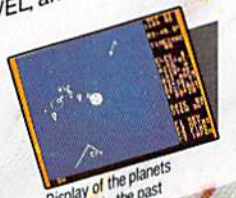
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