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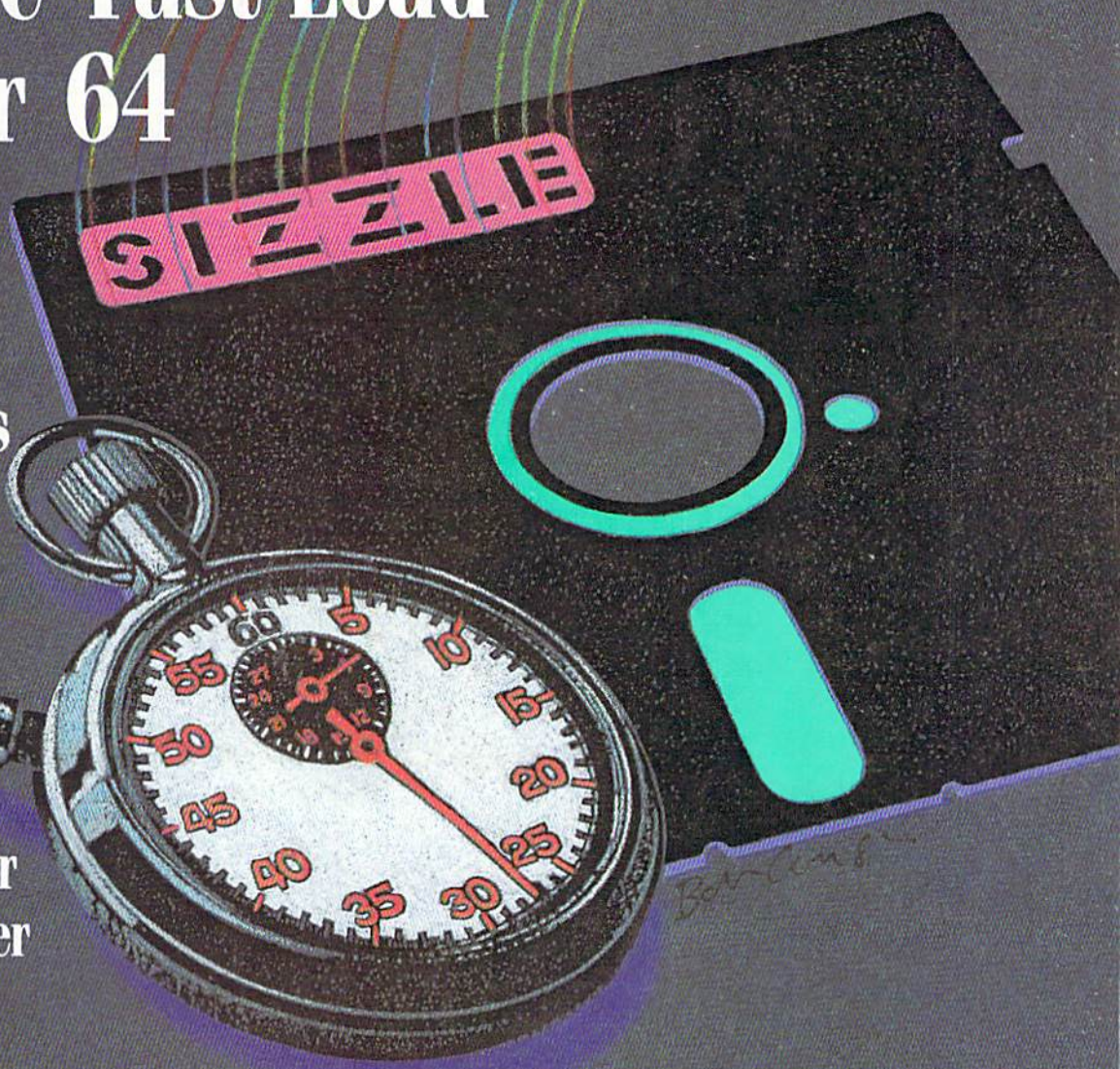

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Television Highlights

Weather

ED'S WEEKLY

The views and news of Ed.

December 3

Basquing In The Beauty of Andorra

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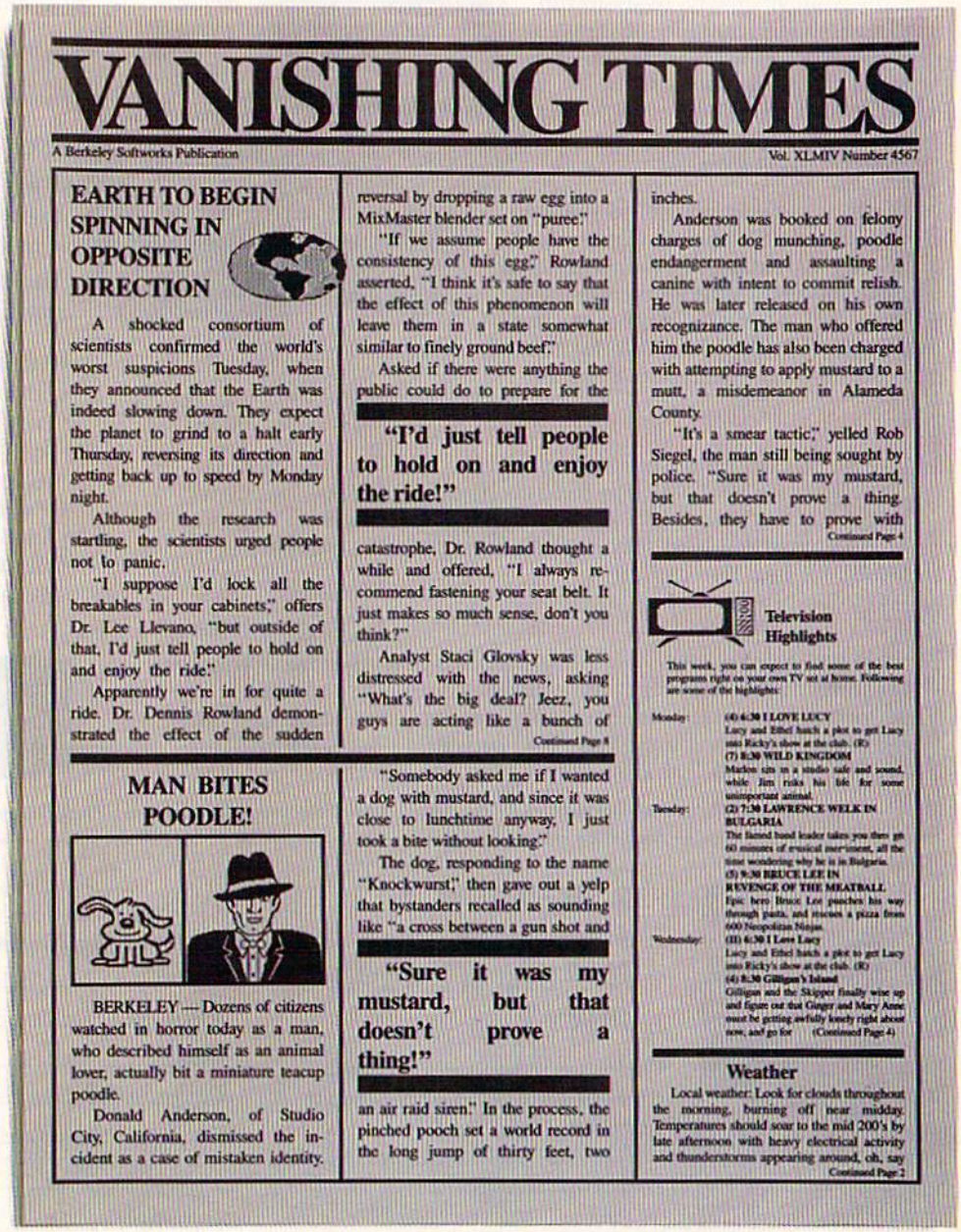
VANISHING TIMES

A Berkeley Softworks Publication

Vol. XLMIV Number 4567

EARTH TO BEGIN SPINNING IN OPPOSITE DIRECTION

A shocked consortium of scientists confirmed the world's worst suspicions Tuesday, when they announced that the Earth was indeed slowing down. They expect the planet to grind to a halt early Thursday, reversing its direction and getting back up to speed by Monday night.

Although the research was startling, the scientists urged people not to panic.

"I suppose I'd lock all the breakables in your cabinets," offers Dr. Lee Llevano, "but outside of that, I'd just tell people to hold on and enjoy the ride."

Apparently we're in for quite a ride. Dr. Dennis Rowland demonstrated the effect of the sudden reversal by dropping a raw egg into a MixMaster blender set on "puree."

"If we assume people have the consistency of this egg," Rowland asserted, "I think it's safe to say that the effect of this phenomenon will leave them in a state somewhat similar to finely ground beef."

Asked if there were anything the public could do to prepare for the catastrophe, Dr. Rowland thought a while and offered, "I always recommend fastening your seat belt. It just makes so much sense, don't you think?"

"I'd just tell people to hold on and enjoy the ride!"

Analyst Staci Glovsky was less distressed with the news, asking "What's the big deal? Jeez, you guys are acting like a bunch of

Continued Page 8

MAN BITES POODLE!

BERKELEY — Dozens of citizens watched in horror today as a man, who described himself as an animal lover, actually bit a miniature teacup poodle.

Donald Anderson, of Studio City, California, dismissed the incident as a case of mistaken identity.

"Somebody asked me if I wanted a dog with mustard, and since it was close to lunchtime anyway, I just took a bite without looking."

The dog, responding to the name "Knockwurst," then gave out a yelp that bystanders recalled as sounding like "a cross between a gun shot and an air raid siren." In the process, the pinched pooch set a world record in the long jump of thirty feet, two inches.

"Sure it was my mustard, but that doesn't prove a thing!"

Anderson was booked on felony charges of dog munching, poodle endangerment and assaulting a canine with intent to commit relish. He was later released on his own recognizance. The man who offered him the poodle has also been charged with attempting to apply mustard to a mutt, a misdemeanor in Alameda County.

"It's a smear tactic," yelled Rob Siegel, the man still being sought by police. "Sure it was my mustard, but that doesn't prove a thing. Besides, they have to prove with

Continued Page 4

Television Highlights

This week, you can expect to find some of the best programs right on your own TV set at home. Following are some of the highlights:

Monday:
(4) 6:30 I LOVE LUCY
Lucy and Ethel hatch a plot to get Lucy into Ricky's show at the club. (R)
(7) 8:30 WILD KINGDOM
Marlon sits in a studio safe and sound, while Jim risks his life for some unimportant animal.

Tuesday:
(2) 7:30 LAWRENCE WELK IN BULGARIA
The famed band leader takes you there an 60 minutes of musical merriment, all the time wondering why he is in Bulgaria.
(5) 9:30 BRUCE LEE IN REVENGE OF THE MEATBALL
Epic hero Bruce Lee punches his way through pasta, and rescues a pizza from 600 Neapolitan Ninjas.

Wednesday:
(11) 6:30 I Love Lucy
Lucy and Ethel hatch a plot to get Lucy into Ricky's show at the club. (R)
(4) 8:30 Gilligan's Island
Gilligan and the Skipper finally wise up and figure out that Ginger and Mary Anne must be getting awfully lonely right about now, and go for

(Continued Page 4)

Weather

Local weather: Look for clouds throughout the morning, burning off near midday. Temperatures should soar to the mid 200's by late afternoon with heavy electrical activity and thunderstorms appearing around, oh, say

Continued Page 2

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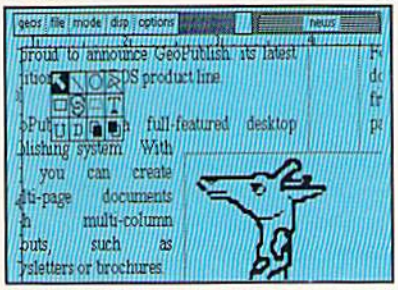

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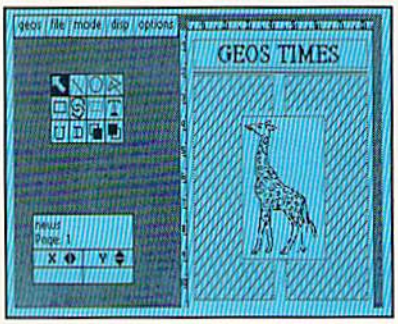

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VOLUME 4, NUMBER 12

RUN

DECEMBER '87

COVER ILLUSTRATION BY BOB CONGE

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*THIS ARTICLE CONTAINS A PROGRAM LISTING. THE PROGRAM IS ALSO AVAILABLE ON THE NOVEMBER-DECEMBER 1987 RERUN DISK. SEE THE RERUN SUBSCRIPTION CARD AT PAGE 65.

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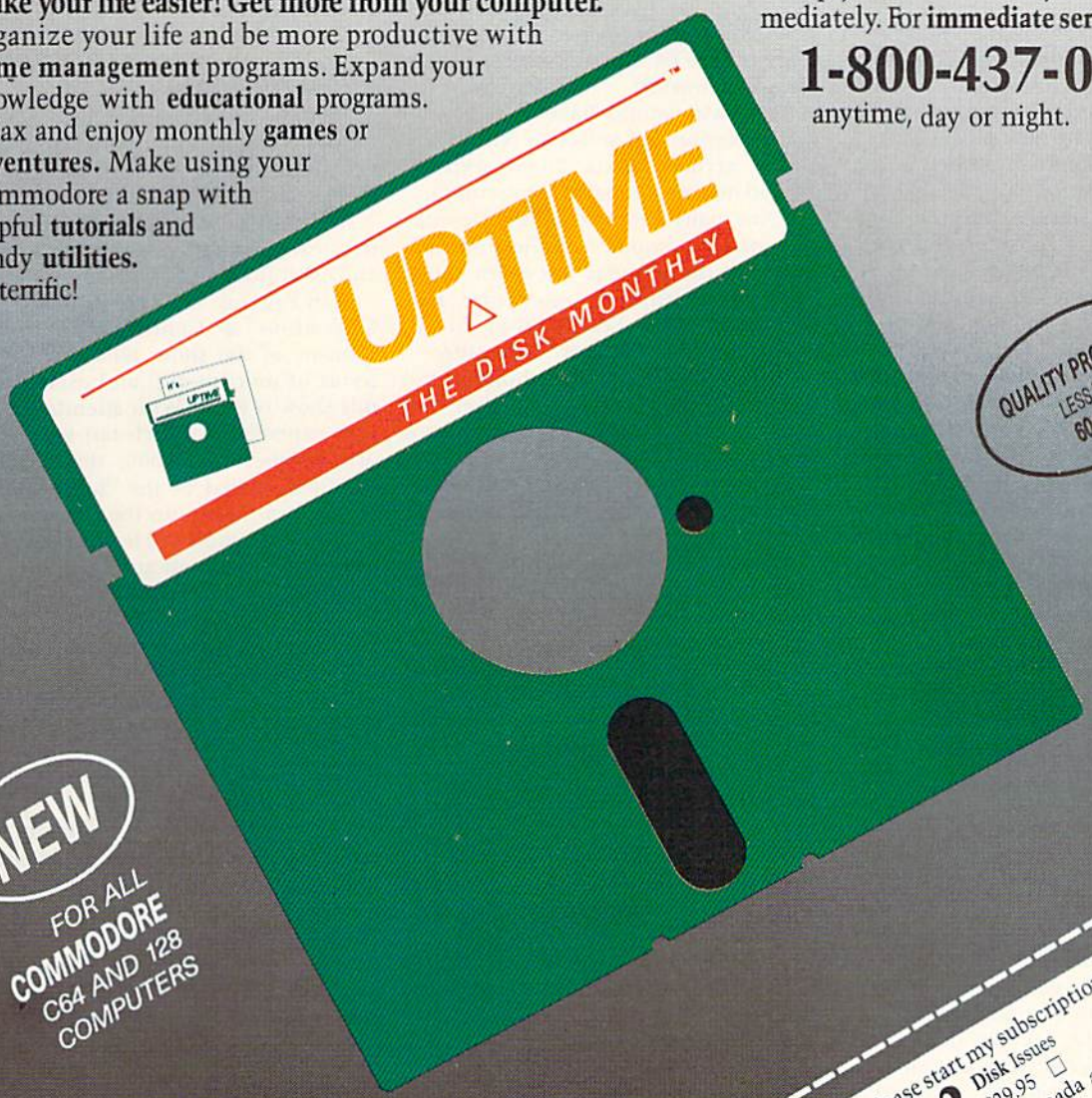

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R-12

Commodore Magazine
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RUNning Ruminations

Is bigger necessarily better when it comes to home-computer use?

Wild for Computers

To judge from newspaper reports and advertisements, the personal-computer industry is wholly inhabited by speed freaks, techies, power users and those easily impressed by new widgets.

USA Today recently published a special section devoted to coverage of what's hot in the world of personal computers. When you consider new computers, it's easy to get caught up in statistics about speed, capacity and multiprocessing power. Which is apparently what happened to *USA Today*.

The section painted a rosy picture for the under-$10,000 market, with sales expected to soar based on the growth of sophisticated, high-powered (and expensive) units (e.g., the $7000 IBM PS/2 models and the $5000 Mac II). But this is a myopic view. The paper would have you believe that 1 megabyte, 10 MHz and 16 million colors are the norm. Does the average computer user really need all that power?

Full of colorful charts, graphs, sidebars and profiles, the section was lacking one key element—mention of an inexpensive, easy-to-use home computer (i.e., the Commodore 64). The ten-page section was dominated by two marketing giants—IBM and Apple (both of whom, incidentally, placed ads in the section).

Are computers, like cars, becoming the status symbols of the 80s? Do you really need eight cylinders when four will get you where you want to go?

Their failure to mention the 64 was a major oversight. I know that Commodore has suffered from lack of recognition in the past, but surely the reporters for this widely circulated daily that claims to be "the Nation's Paper" are aware of the popularity of the 64, which has found its way into more homes across the country than any other computer.

Not one multi-colored graphic showed the 64 as either the leading computer in terms of unit sales or as the least expensive computer in terms of computing power.

If the computer industry is really to take off, it will have to catch on at the grass roots level. (After all, isn't the Commodore 64 the Volkswagen of the computer world?)

USA Today would have you believe that everyone can relate to NASA scientists, archaeologists, Titanic explorers and marine biologists using computers. Not many people can identify with such exotic computer applications, or care that the popular television show *Moonlighting* features a computer. Despite *Today*'s claims, I don't consider these applications as "integral" to my life.

Buried beneath their plethora of statistics, *USA Today* failed to uncover the real story: If personal computers are to become more prevalent and affect our lives, it will be the inexpensive home computer and not the "supercomputer" that will attract the consumer.

While computer manufacturers attempt to cash in on the business market, the door is wide open for someone (are you listening, Commodore?) to lock up the home market by addressing the needs of the average consumer. It's a great opportunity to show the teacher, the housewife, the small-businessman, the retired person, etc., how the computer can effectively be used in their respective situations.

The Wall Street Journal, too, divides the microcomputing world into two major sections—for the IBM and Apple—with a small wedge for Tandy. "Personal-computer advertisements," a recent article states, "appear to be aimed at those with a degree in electrical engineering."

What about those looking for a basic, efficient computer to handle a few elementary tasks such as word processing, helping with family finances, entertainment applications and a few others? This is not to say that that's all the Commodore machines are capable of. But for ease of use and the best bang for your buck, I don't know of any computer that compares. Even in a crowded marketplace, the 64 still stands out as an excellent buy and an outstanding choice for first-time computer users.

Let Cybill and Bruce fight over who uses the Mac II. I'll stick with Commodore.

Toronto Show

Toronto, with its extremely large base of sophisticated Commodore computer users, will be the scene once again of this year's World of Commodore show.

RUN will be traveling across the border next month to meet with showgoers and exhibitors at this fifth annual event.

Stan Pagonis, Director of Marketing Operations at Commodore Canada, sponsor of the show, tells us that "in terms of user interest and excitement, this show is tops." With attendance figures expected to match last year's record number of 38,000, this show is justifiably billed as the "largest Commodore exhibition in the world."

This year's show will feature seminars conducted by noted authorities in the Commodore field. Developers will also be displaying their new Commodore-related products. It's a good opportunity for consumers to view the latest in software and peripherals and to learn about new technologies and applications in the Commodore market. Of course, Commodore Canada plans a big presence at the show.

This year's theme will highlight the educational, home, business and entertainment applications for the Commodore line, including their two newest computers, the Amiga 500 and 2000.

The four-day event will be held from Thursday through Sunday, December 3–6, at the International Centre, 6900 Airport Rd., Mississauga, Ontario.

For more information about the show, contact Kathy Dimopoulos, Promotions Manager at Commodore Canada, 416-499-4292.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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MAGIC

Play some holiday ditties; check your disks' write-protect status; add a fancy border to your screen displays; and more.

Compiled by JIM BORDEN

$44E White Christmas

This program plays a C-64 version of Irving Berlin's White Christmas and simultaneously produces a screen display that simulates falling snow.

```
10 REM WHITE CHRISTMAS-J.R.CHARNETSKI
20 POKE53280,5:POKE53281,0:PRINT"{SHFT CLR
   }{CTRL 2}"
30 S=54272:FORI=STOS+23:POKEI,0:NEXT
40 POKES+24,15:POKES+5,9:POKES+6,9:FORJ=1T
   O68:READHF,DU:CS=CS+HF+DU:POKES+1,HF
50 POKES+4,17:FORE=0TO28*(DU+1)
60 IFD=XTHENPRINT"{HOME}{CRSR DN}";SPC(RND
   (1)*38+1);".{HOME}{CRSR DN}{CRSR LF}"CH
   R$(148):POKE218,156:X=X+10
70 NEXT:POKES+4,16:X=0:NEXT:POKES+24,0
80 IFCS<>6422THENPRINT"DATA ERROR":END
90 PRINT"{SHFT CLR}MERRY CHRISTMAS!!!"
100 DATA 84,3,89,,84,,79,,84,,89,3,94,
110 DATA 100,3,112,,126,,134,,150,,134,
120 DATA 126,,112,,100,5,67,,75,,84,1
130 DATA 84,1,84,,112,1,100,,67,1,67,1
140 DATA 67,,100,1,89,,84,2,84,,89,,84,
150 DATA 75,,67,,75,5,84,3,89,,84,,79,
160 DATA 84,,89,3,94,,100,2,112,,126,
170 DATA 134,,150,,134,,126,,112,,100
180 DATA 5,67,,75,,84,1,84,1,84,,112,1
190 DATA 100,,134,5,67,,75,,84,1,84,1
200 DATA 112,,63,,63,1,63,,67,5
```

—JOSEPH R. CHARNETSKI, DALLAS, PA

$44F Jingle Bells

My program plays a lively C-64 version of this song by J. S. Pierpont.

```
1 REM C-64 JINGLE BELLS-J.R.CHARNETSKI
2 A$="GGGGGGGO>BGIIIIIGGGGBBGBOGGGGGGGO>BG
  IIIIIGGGOOIB>6GB>666GB>99IGB<OOIBG6G"
3 B$="B>666GB>99IGBOOOOUOIB>OGGGGGGGO>BGII
  IIIGGGGBBGBOGGGGGGGO>BGIIIIIGGGOOIB>"
4 C$="BBDBBDBBCAHBBCABBCABBBBDDBBDBBDBBCAH
  BBCABBCABBBBHBBBBGABBBBHBBBBHBBBBHBB"
5 D$="BBGABBBBHBBBBBBCABBBBDDBBDBBDBBCAHBB
  CABBCABBBBDDBBDBBDBBCAHBBCABBCABBBBH"
6 A$=A$+B$:D$=C$+D$:W=54272:FORI=WTOW+23:P
  OKEI,0:NEXT:POKEW+5,9:POKEW+24,15
7 FORI=1TO144:POKEW+1,ASC(MID$(A$,I,1))-29
  :POKEW+4,33
8 FORJ=1TO100*(ASC(MID$(D$,I,1))-64):NEXT:
  POKEW+4,32:NEXT:POKEW+24,0
```

—JOSEPH R. CHARNETSKI, DALLAS, PA ►

TRICK OF THE MONTH

$450 C-64 Easy Printer Control

My program adds two new commands to the Basic vocabulary to help make your printer obey your computer.

The first command is *P, which directs all output from the screen to the printer. It's equivalent to OPEN4,4,0:CMD4.

The second command is *S, which redirects the output back to the screen. It's equivalent to PRINT#4:CLOSE4. The device number is the second 4 in line 80 and the secondary address is the 0 in line 80. These numbers can be changed as required (along with the checksum value in line 20).

```
0 REM OUTPUT CONTROL-GEOFFREY KERCHNER
10 C=0:FORA=49152TO49233:READB:POKEA,B:C=C
   +B:NEXT
20 IFC<>9125THENPRINT"DATA ERR.":END
30 SYS49152:PRINT"NEW COMMANDS:"
40 PRINT:PRINT"*P - OUTPUT TO PRINTER"
50 PRINT"*S - OUTPUT BACK TO SCREEN"
60 DATA 169,11,162,192,141,8,3,142,9,3,96,
   32,115,0,201,172,240,6,32,121,0,76
70 DATA 231,167,32,115,0,201,80,240,7,201,
   83,240,33,76,8,175,169,0,32,189,255
80 DATA 169,4,162,4,160,0,32,186,255,32,19
   2,255,162,4,32,201,255,134,154,32,115
90 DATA 0,76,174,167,162,4,32,195,255,32,2
   04,255,32,115,0,76,174,167
```

—GEOFFREY KERCHNER, OAK RIDGE, TN

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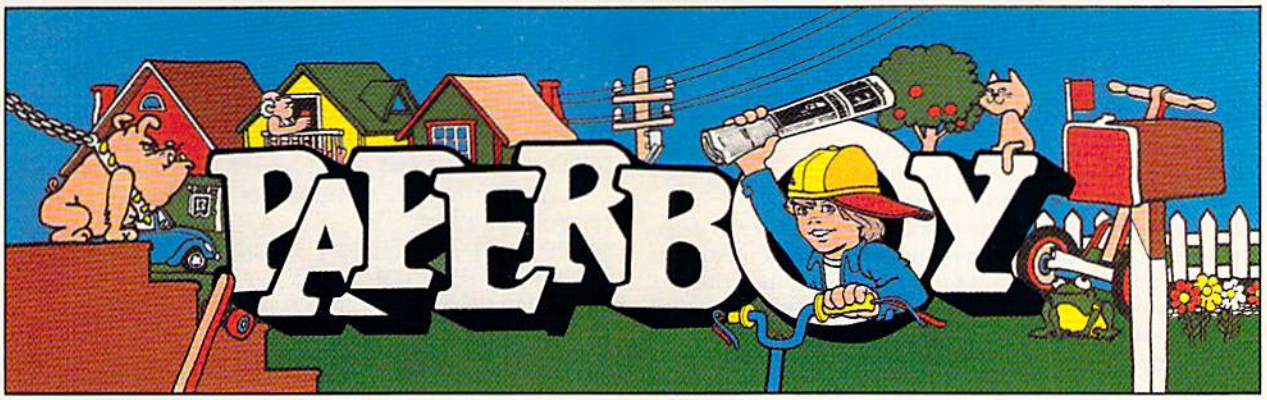
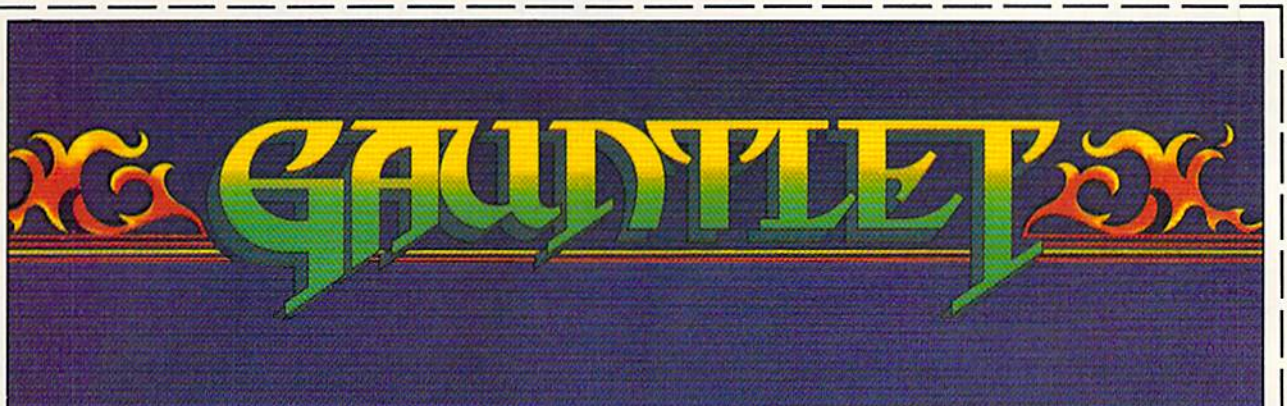
CUT HERE





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$451 Right On?

My Write-Protect Check routine assesses the write-protect status of the disk in your drive. It's compatible with the 1541 or 1571 and any Commodore computer.

The routine examines a byte in the drive's memory to determine whether the disk is write-protected. If it is, a message is printed and the computer waits for you to remove the write-protect tab and press a key. After it checks again and finds the tab off, it continues with the rest of the program. You can use this routine in any program that writes files to disk.

```
10 REM WRITE-PROTECT CHECKER-NGHIA TRAN
20 OPEN 15,8,15
30 PRINT#15,"M-R"CHR$(30)CHR$(0)
40 GET#15,V$:V=ASC(V$+CHR$(1))
50 IF V=1 THEN 70
60 IF V=16 THENPRINT"TAB OFF":GOTO110
70 PRINT"PLEASE REMOVE WRITE-PROTECT TAB"
80 PRINT"PRESS ANY KEY WHEN READY"
90 GET B$:IF B$="" THEN 90
100 GOTO 30
110 CLOSE 15
120 REM -- YOUR PROGRAM STARTS HERE --
```

—Nghia Tran, Petaluma, CA

$452 Print Quality

I was pleased with my printer's performance until I happened to notice that the print quality was weak compared to the printers at my office. The ribbon deteriorates so slowly that it's difficult to detect any change in print quality right away. I now keep a sample sheet printed with a new ribbon for comparison.

—David M. Palo, Escanaba, MI

$453 Long C-64 Lines

The Basic On-Gosub command is helpful, but sometimes you need to use it in a program line with more line numbers than will fit on an 80-character screen line. To get around this, just split the line numbers into two lines. Here's an example. The line

```
100 ON A GOSUB 1100,1200,1300,1400,1500,1600,
    1700,1800,1900,2000,2100,2200,2300,2400,2500
```

is too long, so we'll break it into two lines as follows:

```
100 IF A>8THEN110
103 ON A GOSUB 1100,1200,1300,1400,1500,1600,1700,1800
106 GOTO 120
110 ON A-8 GOSUB 1900,2000,2100,2200,2300,2400,2500
120 . . .program continues here. . .
```

By breaking up the long line, you can still use the On-Gosub command with almost any number of target lines.

—Stephen Tang, Address unknown

$454 Just the Factors, Please

This short program will find the factors of any whole number and print them on the screen.

```
10 REM FACTOR FINDER-DARYL BRANSON
20 POKE53280,0:POKE53281,12
30 PRINT CHR$(14)
40 PRINT:INPUT "WHAT'S THE NUMBER";N:N1=N
50 IF N=0THEN END
60 IFN<1ORINT(N)<>NTHEN PRINT"ONLY WHOLE N
   UMBERS ABOVE 0 PLEASE!":GOTO40
70 FORFP=2TON
80 IF N/FP=INT(N/FP) THEN PRINTFP"*";:Z=1:
   N=N/FP:GOTO70
90 NEXT:PRINT"{CRSR LF}="N1:GOTO40
```

—Daryl Branson, Branson, MO

$455 Finding Your Roots

Everyone knows how to find a square root on a Commodore, but how do you find other roots? The answer is in the power, or up-arrow, function. Just raise the number to the reciprocal of the root you want. For example, to find the cube root of 1860867, enter PRINT 1860867↑(1/3) to get an answer of 123. Be sure to use parentheses for the reciprocal part of the calculation.

—Lance Sloan, Swartz Creek, MI

$456 C-64 Fancy Border Printer

The following routine prints a border around the screen in a unique and visually interesting way. The routine starts printing in the middle of the top line and extends toward both sides, then downward and finally inward to the middle of the bottom line. When the routine is finished, the cursor appears at the upper-left corner of the screen.

```
10 REM C-64 BORDER PRINTER-J.R.CHARNETSKI
20 C$="{CTRL 9}*":PRINT"{SHFT CLR}";
30 FORI=1TO19:PRINTTAB(20-I)C$TAB(19+I)C$"
   {HOME}";:NEXT
40 FORI=1TO24:PRINTC$SPC(38)C$;:NEXT
50 PRINTC$TAB(38)C$"{CRSR LF}{SHFT INST} {
   CRSR UP}"
60 FORI=1TO19:PRINTTAB(I)C$TAB(39-I)C$"{CR
   SR UP}":NEXT
70 FORL=217TO242:POKEL,PEEK(L)OR128:NEXT
80 PRINT"{HOME}":REM RETURN
90 GETA$:IFA$=""THEN90
100 PRINT"{SHFT CLR}";:IFA$="R"THEN30
```

—Joseph R. Charnetski, Dallas, PA

$457 C-64 Screen Row Clear

You can clear any single line on the C-64's screen with this line:

```
POKE 781,X:SYS59903
```

The value of X determines the line to be cleared and ranges from 0 to 24. You can clear a section of the screen with a short loop. As an example, the following will clear the top five lines:

```
FOR X=0 TO 4:POKE 781,X:SYS59903:NEXT
```

—Jing Bo Li, Brooklyn, NY

$458 C-64 SYSound

Programming the 64's sound chip is tedious at best. My program simplifies the process. To play a sound, use:

```
SYS 679,AD,SR,HF,LF,W,D
```

►

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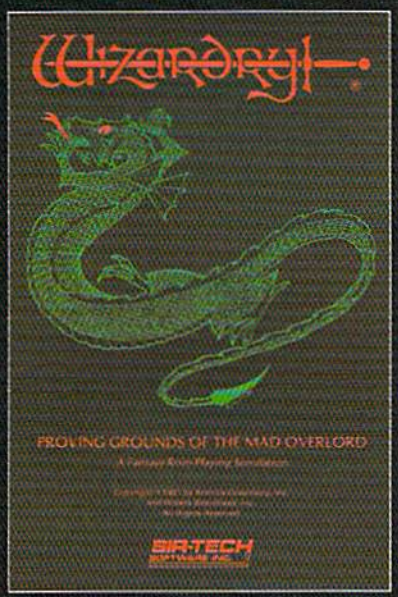

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PLAY IT TO THE HILT!

* Many other Wizardry scenarios coming for Commodore players.

where AD is the attack/decay rate (use values 0–255), SR is the sustain/release rate (values 0–255), HF is the high frequency of the note (INT(frequency/256)), LF is the low frequency (frequency – HF*256), W is the waveform (triangle = 17, sawtooth = 33, noise = 129) and D is the duration of the sound (0–255). If you accidentally use a duration that's too long, stop the sound with run-stop/restore. The program uses only voice #1.

```
Ø REM C-64 SOUND-RICHARD PENN
1Ø FORU=679TO753:READQ:POKEU,Q:C=C+Q:NEXT
2Ø IFC<>9932THENPRINT"CHECK DATA":STOP
3Ø PRINT:PRINT"SYS 679,A/D,S/R,HF,LF,W,D":
   SYS679,Ø,24Ø,34,75,17,25
4Ø DATA 32,23Ø,2,169,15,141,24,212,32,241,
   183,142,5,212,32,241,183,142
5Ø DATA 6,212,32,241,183,142,1,212,32,241,
   183,142,Ø,212,32,241,183,142
6Ø DATA 4,212,32,241,183,134,2,162,1Ø,16Ø,
   255,136,2Ø8,253,2Ø2,2Ø8,248,198
7Ø DATA 2,165,2,2Ø8,24Ø,32,23Ø,2,96,16Ø,24
   ,169,Ø,153,24,212,136,2Ø8
8Ø DATA 25Ø,96,Ø
```

—Richard Penn, Montreal, Quebec, Canada

$459 Enhanced 64 Notepad Menu

Here's an enhanced version of the main menu of Bob Kodadek's fine 64 Notepad V3.0 program (Listing 3 on page 47 of the June 1987 issue of *RUN*). Load the listing and change or add the lines below:

```
Ø REM NOTEPAD MENU-FRANK S RUARK
1ØØ PRINT CHR$(147)SPC(92)F$
11Ø PRINT SPC(82)"1.PRESS CTRL-O TO OPEN W
    INDOW."
111 PRINT SPC(44)"A. SHIFT-CLR ERASES GARB
    AGE"
112 PRINT SPC(4)"B. CTRL-D LISTS 1-KEY DOS
     COMMANDS"
113 PRINT SPC(4)"C. CTRL-P CHANGES TEXT CO
    LOR"
114 PRINT SPC(4)"D. F1 SAVES WINDOW"
115 PRINT SPC(4)"E. F3 PRINTS WINDOW"
116 PRINT SPC(4)"F. F5 PRINTS FULL SCREEN"
117 PRINT SPC(4)"G. F7 LOADS A SAVED WINDO
    W"
12Ø PRINT SPC(42)"2.PRESS CTRL-C TO CLOSE
    WINDOW."
13Ø PRINT SPC(82)"3.PRESS RUN/STOP-RESTORE
     TO DISABLE."
14Ø PRINT SPC(82)"4.TO RE-ENABLE, ENTER SY
    S 51Ø72.":SYS51Ø72
15Ø NEW
```

Slight changes in the SPC( ) entries of lines 100, 110, 120, 130 and 140 make room for the new lines 111–117 above. Now all functions appear on the menu, indented to show that they are executed inside the opened window.

—Frank S. Ruark, Winston-Salem, NC

Magic is the original *column of reader-submitted hints and tips. Each month we present brief, useful computer tricks to help you get the most out of your Commodore system—whether you're a beginning or advanced computerist, a C-64 or C-128 owner. Magic is a forum for* RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to:*

Magic
RUN Magazine
80 Elm St.
Peterborough, NH 03458

RUN *pays $10 to $40 for each trick published in the column. A payment of $50 and a Magic Contributor T-shirt is awarded for the Trick of the Month. The Trick of the Month must be for the C-64 or the C-64 and C-128. Tricks for C-128 mode only are not eligible for Trick of the Month.*

If you'd like a copy of the latest edition of RUN*'s Magic Trick Writer's Guide, send your request with a self-addressed, stamped, business-size envelope; you'll receive a copy in two or three weeks.*

MEGA-MAGIC

RUN it right:
C-64, C-128;
1541 or 1571 disk drive

Learn exactly where the program and sequential files are located on your disks.

Tracking Down Tracks and Sectors

My utility program gives you the disk track and sector of any sequential file or Basic or machine language program.

When you run the program, enter the complete filename (no wild cards); then enter P or S for the type of file you want to locate. The program will open the directory and read the two bytes immediately preceding the filename you've entered. These two bytes hold the track and sector information for the first block of your file. They'll be displayed on the screen, and if there are more blocks, the program asks if you want to see the track and sector of each remaining block. If you answer Y, the other blocks will also be displayed. R

—Joseph R. Charnetski, Dallas, PA

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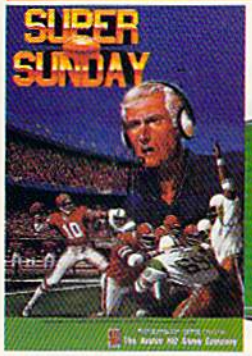
Listing 1. Track and Sector Finder program.

```
10 PRINT"{SHFT CLR}TRACK & SECTOR FINDER"
20 REM BY JOSEPH R. CHARNETSKI (1987)
30 INPUT"{CRSR DN}FILENAME";F$:IFF$=""GOTO
   30
40 INPUT"{CRSR DN}FILE TYPE [P OR S]{2 SPA
   CEs}P{3 CRSR LFs}";T$
50 IFT$<>"P"ANDT$<>"S"GOTO40
60 FT$=F$+","+T$+",R"
70 LF=LEN(F$):Z$=CHR$(0)
80 PRINT"{CRSR DN}WORKING{CRSR UP}"
90 OPEN15,8,15,"I0":GOSUB340
100 OPEN2,8,2,"0:"+FT$:GOSUB340
110 OPEN3,8,3,"$0,S,R":GOSUB340
120 FORI=1TO254:GET#3,A$:NEXT
130 IF(N=0)OR(N=8)THEN N=1:GOTO150
140 N=N+1:GET#3,A$,A$
150 GET#3,A$:TY=ASC(A$+Z$)-128
160 GET#3,A$:T=ASC(A$+Z$)
170 GET#3,A$:S=ASC(A$+Z$)
180 D$="":FORI=1TO16:GET#3,A$:D$=D$+A$:NEX
    T
190 FORI=1TO10:GET#3,A$:NEXT:GET#3,B$
200 IF(LEFT$(D$,LF)<>F$)OR(TY=0)GOTO130
210 BL=ASC(A$+Z$)+256*ASC(B$+Z$)
220 IFBL>1THENBC=1:GOSUB320:PRINT:GOTO240
230 GOSUB330:GOTO370
240 INPUT"FIND REMAINING T&S{2 SPACEs}Y{3
    CRSR LFs}";A$
250 IFA$<>"Y"GOTO370
260 OPEN4,8,4,"#":GOSUB340:PRINT
270 PRINT#15,"B-R:4,0";T;S
280 PRINT#15,"B-P:4,0"
290 GET#4,A$:T=ASC(A$+Z$):IFT=0GOTO370
300 GET#4,A$:S=ASC(A$+Z$)
310 BC=BC+1:GOSUB320:GOTO270
320 PRINT"BLOCK";BC;"{CRSR LF}: ";
330 PRINT"TRACK";T;" SECTOR";S:RETURN
340 INPUT#15,EN,EM$,ET,ES
350 IF EN=0THEN RETURN
360 PRINT"ERROR:"EN;EM$;ET;ES
370 CLOSE4:CLOSE3:CLOSE2:CLOSE1
```

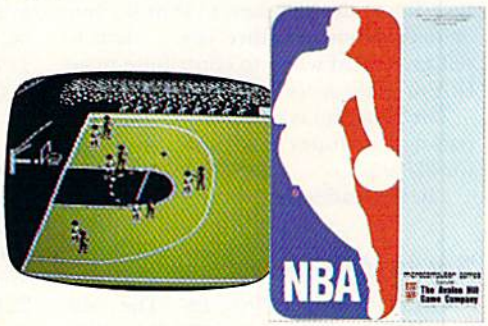
■

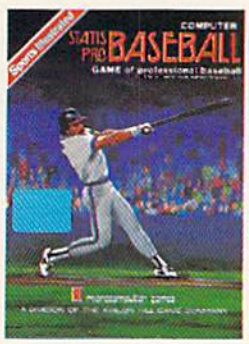


BIG LEAGUE SPORTS

SUPER SUNDAY—Armchair quarterbacks the world over have made SUPER SUNDAY the best selling computer football game . This we attribute to the right blend of graphics, game play and especially statistics, because that's what sets Avalon Hill sports games from the pack. The vicarious experience of coaching real-life players, second guessing your computer or human opponent and the feeling of BEING THERE will send you back to SUPER SUNDAY over and over again. Support of the game system also makes it distinct. You can get the entire '84, '85 or '86 season disks with rosters and stats for all the big league team starters and interchange teams of the past and present. The all new General Manager's Disk (also available separately) allows you to create "dream teams" in setting up your own Pro Football draft. Available for Apple® II, C® 64/128, IBM® PC for $35.00

NBA—We have taken the same concept as SUPER SUNDAY from the field and put you down on the court in NBA, the definitive pro basketball game. Licensed by The National Basketball Association, NBA gives you the same flexibility, visuals and real-life player stats so you can coach the Celtics dynasty, Kareem, Magic and the Lakers or eighteen other great pro B-Ball teams. Available for Apple® II and C® 64/128 for $39.95; IBM® coming soon.





STATIS PRO BASEBALL—It's funny that America's favorite sports pastime has not been our best selling computer sports game. Maybe it's because you haven't known about it 'til now. COMPUTER STATIS PRO BASEBALL (based on our best-selling board game) has elicited countless letters of praise from computer baseball fanatics and stat buffs alike. Although it lacks the graphic flair of SUPER SUNDAY and NBA, it's a dandy of a stat baseball game ... and offers more game utilities right on the Master Game disk than any others—such as DESIGN YOUR OWN TEAMS, STAT COMPILER and DRAFT YOUR OWN TEAMS functions. Also, we offer ten past season disks. Available for Apple® II and C® 64/128 for $35.00

Look for our games wherever good software is sold, or call direct for ordering information ... AVALON HILL, the first name in sports and strategy games!

Dial **1-800-638-9292**. Ask for Operator R11.

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NEWS AND NEW PRODUCTS

Send a friend your own postcard creations or a caricature of himself at the keyboard. Also, why are some computerists suffering from "computer syndrome"?

Compiled by HAROLD R. BJORNSEN

SPEED LIMIT 200

SAN RAFAEL, CA—Superbike Challenge, an action-arcade game for the C-64, has you racing on 12 Grand Prix courses, including Austria's Salzburgring and Great Britain's Silverstone. You and a friend can race each other, using joysticks or the keyboard in one of three skill levels, and the program has a pair of side-by-side screens, so you both have your own view of the race. In addition, you can race against computer-controlled bikers at speeds up to 200 miles per hour. A save feature lets you save games between races. It's available for $19.95 from Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.

Check Reader Service number 400.

DON'T BET ON IT

TWO HARBORS, MN—Taxaid Software (606 2nd Ave., Two Harbors, MN 55616) has released Future-Tax, a tax-planning program for the C-64. The program calculates your income tax for 1988 and '89, based on the new rules of the Tax "Reform" Act.

The program demonstrates the new tax law's effect on you. You can use Future-Tax to decide when to shift income or deductions to future years, when to sell assets and when to contribute to an IRA or make a contribution to charity.

The program is menu-driven, and the package includes a manual. Available for $39.95.

Check Reader Service number 405.

SALES ARE ROSY

PLYMOUTH MEETING, PA—The mid-year IMS National Computer Retail Report, an audit of the first half of 1987 versus the first half of 1986, profiles a thriving industry, with hefty increases in nearly every category.

The audit shows strong growth in retail computer-store purchases of peripheral devices. The number of hard disk drives under four inches sold in 1987 increased 108.6 percent over the 1986 figures. Sales of 5¼-inch hard disk drives rose 129.9 percent, sales of laser printers shot up 168 percent and networking devices increased 160.4 percent.

In the microcomputer category, 8-, 16- and 32-bit desktop computer sales rose .9, 79.6 and 112 percent, respectively. Sales of laptop computers soared 643.4 percent, although that was down from last year's figure of 780.4 percent.

Within the software category, sales of graphics, integrated and utilities software shot up 124, 100.8 and 125.7 percent, respectively. Strong sales were also reported for desktop publishing, education/training, games and project management packages. Only one type of software—databases—showed a decline in sales over last year: down 13 percent

ISN'T THAT SPECIAL!

GILROY, CA—Surprise that special someone with a caricature of them at the computer, personalized with any first name or nickname. Send clear photos (humorous expressions are preferred). Each cartoon is drawn in black and gray inks on heavy, high-quality paper stock, ready for framing. Photos are returned with the drawing. Drawings are available in 11″ × 14″ ($29.95) and 12″ × 16″ ($31.95). Sunrise Manor, PO Box 1378, Gilroy, CA 95021.

Check Reader Service number 406.

PLEASE DO MY HOMEWORK

VIENNA, VA—Students can get help with their homework from qualified teachers by using QuantumLink (8620 Westwood Center Drive, Vienna, VA 22180), the online service for Commodore computers.

Teachers offer scheduled instruction in more than 40 subjects, including English, Science, the Humanities, Foreign Languages and Computer Sciences.

Teachers can work with students in groups and one-on-one and can transmit quizzes, drills and diagnostics programs to students.

Tutoring costs $3.60 per hour, and students require a C-64 or C-128, a modem and membership in Q-Link ($9.95 per month).

Check Reader Service number 404.

AW, IT'S RAINING!

GRAND RAPIDS, MI—Rainy Day Games, a three-in-one games package for children ages four and up, includes the card games of Concentration, Old Maid and Go Fish, with three levels of skill. An eight-page manual is included. Available for the C-64 for $29.95. Baudville, 1001 Medical Park Drive SE, Grand Rapids, MI 49506.

Check Reader Service number 407.

DON'T FORGET YOUR PUPILS' MEMORIES

PLEASANTVILLE, NY—Sunburst (Pleasantville, NY 10570) has released two memory-skills programs for the C-64 for $65 each. They include teacher's guides and back-up disks.

As students help Teddy and Iggy (for kindergarten to grade 2) perform tasks, they practice a basic memory skill called chaining, which means remembering items in a sequence.

In Simon Says (for kindergarten to adult), students practice sequencing by remembering a series of colors, numbers or letters.

Check Reader Service number 408.

NEW ZORKIAN ADVENTURE

CAMBRIDGE, MA—Beyond Zork, an interactive fiction game set in the Zorkian universe but not a sequel to the Zork Trilogy, lets you create your own character, using a combination of endurance, strength, compassion, luck, intelligence and dexterity. As the innocent adventurer, you are sent by a few remaining enchanters to reclaim and hide the fabled Coconut of Quendor, within whose shell lies the essence of magic. It's available from Infocom (125 CambridgePark Drive, Cambridge, MA

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02140) for $44.95 for the C-128.

Check Reader Service number 410.

Three from Free Spirit

LAGRANGE, IL—Free Spirit Software (538 S. Edgewood, LaGrange, IL 60525) has released three new C-64 programs.

Outpost is an arcade-action game in which one or two players use missiles to defend their outpost from an onslaught of enemy laser-powered bombs. $19.95. Gospel Greats is a collection of 18 religious songs, and words for each song are displayed on the screen as the music plays. $9.95. English & Scottish Songs II features 20 songs of 17th-century folk music. The historical background of each song and the lyrics are displayed as the music plays. $9.95.

Check Reader Service number 409.

10 GOTO BATHROOM

COPENHAGEN, DENMARK—An 18-year-old computerist who spent 12 to 16 hours a day at his computer has gotten himself to the point where he is confusing computer programs with the real world—a new form of psychosis called "computer syndrome"—according to an article published in the journal, *Weekly for Physicians*.

"He merged with the computer and afforded it supernatural qualities," psychologist Bent Brok said in the article.

And doctors at Copenhagen's Nordvang Hospital, where the unidentified teenager was admitted after suffering from insomnia and anxiety, said he began to think in programming language and to wake up in the night thinking, "Line 10 go to the bathroom, line 11 next."

The patient told the doctors he believes that "man is only a machine. There is no difference between the computer and man."

His preoccupation with computers is not unique, since a large group of computerists—about 95 percent of them boys—are computer freaks who live for nothing but the computer. The three doctors said the youths use their computer as a substitute for human contact, since it always responds in a rational manner, but their overemphasis on logical thinking may lead to immaturity and emotional limitations.

Pet Bug

SANTA MONICA—If you've ever had your bank deposit eaten by an automatic teller or received a bill for a purchase you never made, then you're ready for the Bugaboo.

Each Bugaboo, made of defective computer parts to resemble a bug and trapped in a clear plastic box, has its own distinctive personality ranging from fierce to lovable, and no two bugs look alike. Available for $4.95 from Downtime, 2307 Broadway, Santa Monica, CA 90404.

Check Reader Service number 411.

Drill Your Ears

NAUGATUCK, CT—Ear Training Tutor, a personal music drill program, prompts you to correctly name the tone you hear and displays it in musical notation on the musical grand staff as well as on the on-screen music keyboard. It includes over 50 preset music lessons arranged in escalating difficulty. In addition, you can select any custom combination of melodic or harmonic intervals and triads.

A record-keeping routine tracks lessons you've completed successfully and saves complete test results to disk or prints them out for later evaluation.

You may play Ear Training Tutor through the on-board music chip of the C-64 as well as through an optional Passport-compatible MIDI interface to any MIDI synthesizer. Available for $59.95 from MSB Music Software, 35 Hill St., Naugatuck, CT 06770.

Check Reader Service number 401.

Wish You Were Here

MOUNTAIN VIEW, CA—Postcards, a collection of clip art, backgrounds and captions for creating your own postcards, is available for the C-64 for $24.95 from Activision (2350 Bayshore Parkway, Mountain View, CA 94043).

Let your friends know how things are, with Postcards you create; from Activision.

Postcards' clip art collection includes dumbfounded puppy dogs, bikini-clad warthogs, platypusses, pussy cats, rhinos, rats; people such as Honest Abe, Jungle Jim and Mona Lisa; tacky tourists, silly signs, funky food, awful aliens, and more.

The package also has a paint program so you can write and design your own cards.

Check Reader Service number 403.

These Colors Don't Run

PORTLAND, OR—The Multicolor Mac Inker automatic ribbon re-inker for multicolor ribbons consists of a motorized base and an adapter that fits into the advancing mechanism of the printer cartridge. Individual dispensers release ink specifically and only to the appropriate colored band. The Multicolor Mac Inker and adapter retail for $80. A set of four bottles of colored ink is $6. Computer Friends, 14250 NW Science Park Drive, Portland, OR 97229.

Check Reader Service number 402. ■

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MAIL RUN

This month, RUN *readers continue rapping on the software copying controversy, an author updates a popular program, and more.*

BLOWUP UPDATE

I'm writing to update Jim Grubbs' review of our Blowup screen dump cartridge in last month's Hardware Gallery. The review was done on a prototype of the device, and the problems identified by Mr. Grubbs were all corrected before the product was shipped. The potential for a locked keyboard in some remote situations has been totally eliminated, and information on using Blowup with the C-128 has been added to the manual. We feel that Blowup now performs like a champ.

—MAX YUDITSKY
DSI
WICHITA, KS

We want to clarify that it is RUN*'s policy to review only finished products. We didn't realize that the review copy of Blowup was a prototype.*

—EDITORS

ADDITIONS TO THE SHOPPING LIST

I recently wrote a letter to author Bob Kodadek about a couple of problems I had with his Shopping List program (*RUN*, July 1987), and he was very helpful. He modified the program with a generic print routine so it works with my printer, and he added a paging routine to accommodate my long shopping lists. Many thanks to Bob for his program and his assistance.

—JOHN C. BURT
WOLFEBORO, NH

A number of readers, including Mr. Burt, reported trouble using Shopping List with a non-Commodore-compatible printer. The modified version of the print routine Bob sent them appears below. If your printer isn't Commodore compatible, replace lines 56–61 in the original listing with lines 56–61 below, and Shopping List should work fine.

If, like Mr. Burt, your shopping lists are more than one page long, you can add a paging function to the program by inserting lines 80–83 below in the original listing.

After making your alterations, run the program, and when it asks if you've made any changes, answer yes to save the new version to disk.

```
56 PC=0:NS=5:FORI=1TOA:IFQ%(I)=
   0THEN62
57 GOSUB80:IFPEEK(KP)=60THEN57
58 SQ=Q%(I)*B(I):SU=SU+SQ:IF
   PTHENPRINT#1,A$(I)SPC(21-LEN
   (A$(I))) Q%(I);
59 PRINTA$(I)TAB(18)Q%(I)" @"
   TAB(25);:IFPTHENPRINT#1,SPC(4);
60 N1=B(I):GOSUB65:PRINTTAB(33);:IFP
   THENPRINT#1,SPC(11-LEN(DL$));
61 NI=SQ:GOSUB65:PRINT:IFPTHEN
   PRINT#1,SPC(11-LEN(DL$)) S%(I)
80 PC=PC+1:IF PC<58 THEN RETURN
81 FOR PC=0 TO NS
82 PRINT:IF P THEN PRINT#1
83 NEXT:PC=0:RETURN
```

—EDITORS

DOG SLED, TOO?

In last September's Mail RUN, a reader from Ketchikan, Alaska, said there's no UPS service in that state, but that's incorrect. There are UPS offices in Anchorage, Kenai, Fairbanks and Juneau, and when I called the UPS 800 information number, they stated that "we service all of Alaska, even if we have to deliver by boat or seaplane!" I've used UPS services here in Anchorage for over a year with absolutely no problem.

—MARSHALL RONNE, JR.
ANCHORAGE, AK

BETTER BATTERS

I enjoy playing SubLogic's Pure-Stat Baseball (now being distributed by Software Simulations, Stratford, CT) on my C-64, and I'm wondering if any other *RUN* readers who play the game would like to share box scores. The best box scores my friends and I have come up with are: most RBIs in a 62-game season, 53 by Carl Yastrzemski; most homers in a game by an individual, 3 by ten different players; most homers in a game by a team, 7 by Detroit, Oakland and Seattle; one-hitters, Fernando Valenzuela and Bob Knepper; most strikeouts in nine innings, 16 by Sid Fernandez and Fernando Valenzuela.

—MICHAEL RIDEN
728 WEST PARISH
HARRISBURG, IL 62946

DRAG RACE ELIMINATOR

Scott Wasser's review of Drag Race Eliminator in last October's issue of *RUN* doesn't do justice to this outstanding game. Family Software has created an action-filled program that contains actual 1986 NHRA speed and elapsed-time records for you to try to match or beat. The "Christmas tree" starter is just like the one at the Kansas City International Raceway; your eye/hand coordination better be at top performance so you don't "red light" the start or blow an engine. The two-player head-to-head competition will keep you on your toes at all times. Try Drag Race Eliminator; I think you'll like it.

—GERALD HAPPY
KANSAS CITY, MO

THE SOFTWARE WAR FLARES UP AGAIN

I'm writing to add my opinion to the controversy that's been aired in recent issues of *RUN* (January, April and July 1987) over software copying. I consider copying software, whether for archival storage, fun or profit, no different than copying a book, photograph, HO scale railroad car, computer, refrigerator or automobile. Software, like other items, is subject to wear and tear and, unfortunately, to acts of God (or your cat or children). When the item goes haywire, it requires servicing and goes out to the shop to be fixed, unless you're handy enough to do the repairs yourself. If the item is beyond repair, alas, it must be replaced. That, in every case not covered by a warranty, costs money.

Did Ford provide you with a backup copy when you bought your LTD? Did ►

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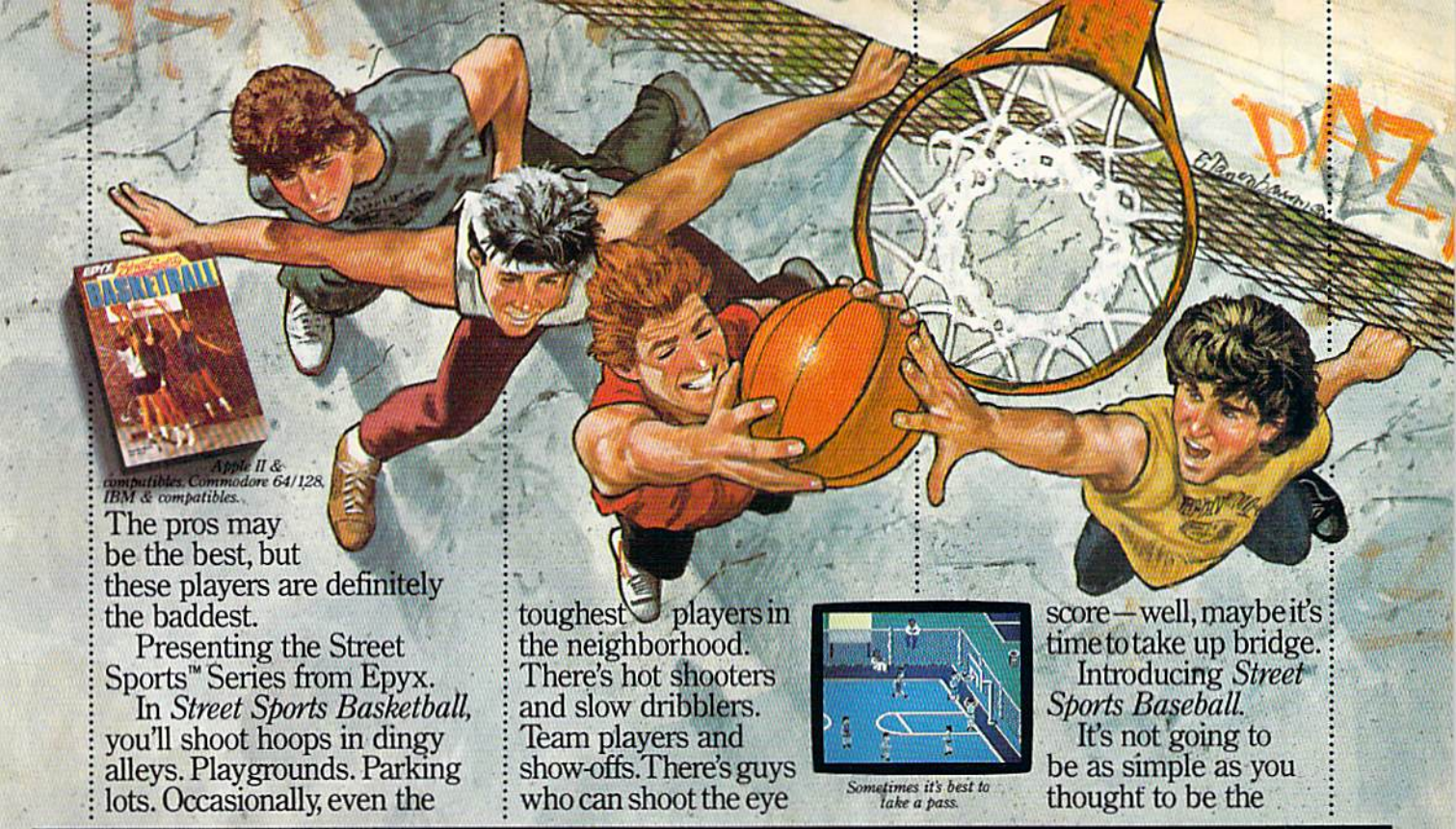


Apple II & compatibles. Commodore 64/128, IBM & compatibles.

The pros may be the best, but these players are definitely the baddest.

Presenting the Street Sports™ Series from Epyx.

In *Street Sports Basketball*, you'll shoot hoops in dingy alleys. Playgrounds. Parking lots. Occasionally, even the suburbs (have fun dribbling on the lawn).

You'll pick your three-person team from the 10 toughest players in the neighborhood. There's hot shooters and slow dribblers. Team players and show-offs. There's guys who can shoot the eye out of a needle at 20 feet. And guys who couldn't sink one if they were sitting on the backboard. Pass on the run. Get that big man on the inside. Let Joey pop 'em from the corners. This is real street strategy. Take a hook shot. A tip-in.

Sometimes it's best to take a pass.

Bounce the ball off the chain-link fence, then go for the basket. Or power through a slam dunk.

But don't dribble in the oil slick. And for heavens sake, watch out for windows.

It's not like any basketball game you've ever played on a computer. But just like every basketball game you've ever played for real.

ANOTHER HIT.

It's bottom of the ninth. Batter's 0 and 2. The score—well, maybe it's time to take up bridge.

Introducing *Street Sports Baseball.*

It's not going to be as simple as you thought to be the first on your block.

After all, you'll have to cope with makeshift diamonds, bases made from spare tires and trashcans, bushes, rocks, even squealing cars.

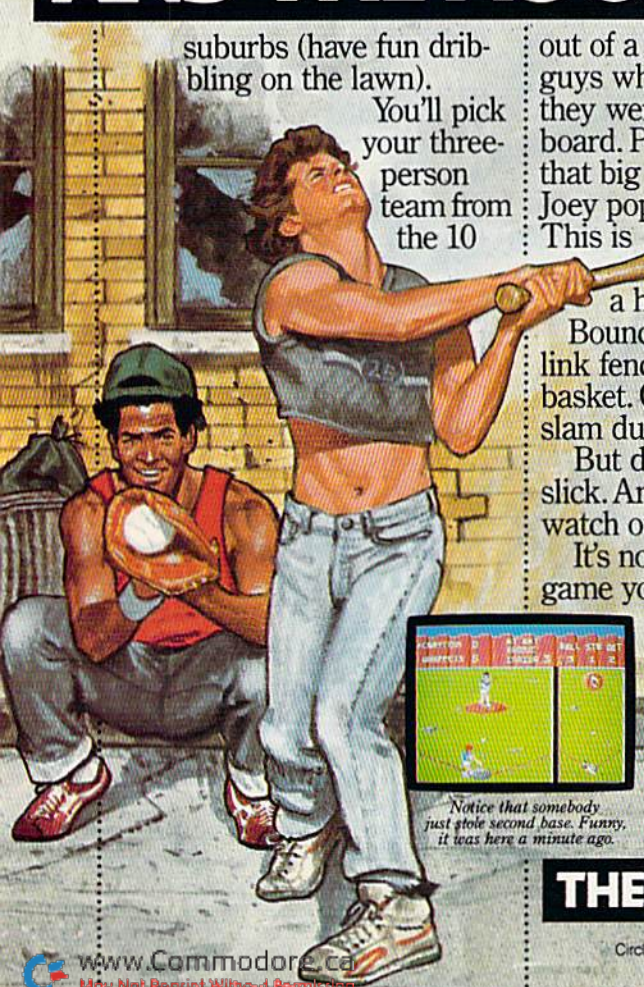
Not to mention 16 neighborhood players. Each with their own personalities and skills in pitching, hitting and fielding. With the right combination, you could be the champs. With the wrong combination, the chumps.

You'll pick the place. The team. The positions. The strategy. And then, you'll be right in the middle of it all. With a split-screen view from above and up close.

It won't be easy. But it's right up your alley. **EPYX**

Apple II & compatibles, Commodore 64/128, IBM & compatibles.

TASTE THE THRILL OF VICTORY AND THE AGONY OF THE STREET.



Notice that somebody just stole second base. Funny, it was here a minute ago.

THE STREET SPORTS SERIES

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Commodore hand you a second C-64 when you bought your first? Did you get two copies of *RUN* for the price of one (in case your dog shreds the first)? No! Then how can you, in good conscience, demand that the software industry provide duplicates? Why single them out?

Productivity is a poor justification. Software is no different than any other product you depend on. If it's out of service, you lose productivity until it's repaired or replaced.

It is not, nor should it be, the responsibility of the software manufacturer to provide a copy ahead of time, in case your disk drive or your own error damages a disk. Also, software developers have the right to prevent you from copying their products, whether by requiring a dongle or by tweaking bits on a disk—as long as they don't damage your equipment.

—Ron Carlson
Orlando, FL

The Federal Copyright Act of 1976, section 117, says "the owner" of a copy of a program is permitted "to make . . . another copy of a program" as long as this is "an essential step" in "utilizing" said program, or for "archival purposes." The key word here is "owner." Most software manufacturers get around this law by defining the consumer as a "licensee," not an owner. Of course, they don't plainly state that fact on the package. Instead, they shrink-wrap their license intent inside the package. I find this practice deceptive, and I think it should be declared illegal.

—Elliott R. Gee
Bassett, VA

A lot of people have been complaining about copy-protected software and the damage it does to disk drives. If you don't want your drive ruined, all you have to do is input the following line of Basic code before you load a copy-protected program. It'll keep the drive head from knocking.

```
OPEN15,8,15:PRINT#15,"M-W";CHR$(106)
CHR$(0)CHR$(1)CHR$(133):CLOSE15
```

Concerning copying programs, if I like a program so much that I want a duplicate, I just buy another disk, because a copy I made would have a shorter life span than one from the manufacturer. As far as returning software goes, I find that some department stores and most mail order firms will refund my money if I'm not statisfied with a program and return it.

Finally, I think manufacturers put "C-128" on boxes containing C-64 software not to be deceptive, but because some consumers still don't realize they can use 64 software on the 128 (in 64 mode).

—Robert Thomas Klace
Miami, FL

I don't believe people copy software to give to their friends because, as some claim, it's too expensive for their friends to buy. They do it so their friends can get something for nothing. Otherwise, these "Robin Hoods" would stuff a few dollars for each copy into an envelope and send it to the manufacturer. Also, if piracy is the result of expensive software, why isn't the freeware/shareware concept working? As the author of Lynx, a freeware program, I know that it isn't. Piracy is *not* an economic issue, period.

—Will Corley
Sacramento, CA

So far, I've purchased seven word processors, three spreadsheets and four databases to get two programs that are satisfactory and one that's passable. At this point, I think I'm justifiably gun-shy. Recently, when I was thinking of buying two programs, I wrote to the manufacturers to get more specific information than what appeared in the ads. A month later, neither company had been courteous enough to reply. With this sort of attitude toward prospective customers, manufacturers create a climate for piracy.

—William G. Toland
Citrus Heights, CA

Business Manager-General Ledger Update

Word has come from Robert Lauder, whose letter in the October Mail RUN praised the CP/M Business Manager-General Ledger program, that the package is being marketed by a different firm. Formerly offered by DataComp, in Grants Pass, Oregon, it is now available at $99 from Lightmicro, 3260 New Hope Rd., Grants Pass, OR 97527; 503-479-0748.

—Editors

Singing Praises

I want to commend *RUN* for its commitment to the C-64 and C-128. As a proud C-128 owner, I'd also like to thank companies such as Berkeley Softworks for their high-quality software for the C-128, and the First Osborne Group (FOG) for providing powerful CP/M public domain software, much of which rivals commercial programs in quality and productivity.

—James T. Peeples
Texarkana, TX

To Change the Subject a Bit

I went through the typical fascination with copying programs. Now, I don't even own a current copying program, and my only interest lies in archival copies. The thing that's really bothering me lately is the failure of software companies to notify me of updates. I registered two of my applications programs with the manufacturers upon purchase, as per their instructions. In the year that I've owned one of the programs and the three years I've owned the other, I've received no information from either manufacturer about updates, although I know new versions of their programs exist. A few weeks ago, I wrote to one of the manufacturers specifically asking about updates, and I have yet to receive a reply.

What persuaded me to go ahead and buy GEOS was Berkeley's forum on QuantumLink. I know that through this forum I can immediately get the latest information on the program, as well as inexpensive updates. I should think other companies that produce expensive productivity software would follow suit.

—Wes Brockway
Pineville, KY

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—Art Hirst
Exeter, CA

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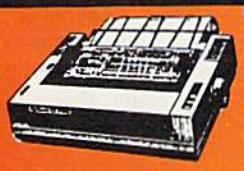

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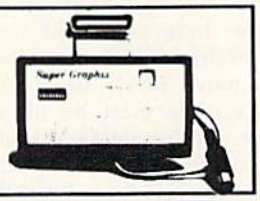

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SOFTWARE GALLERY

Counting pennies this Christmas? Count on this column to show you how to save on software—we've dedicated it solely to reviews of low-cost products!

Compiled by BETH S. JALA

Z-PILOT ..... B

Weapons and Speed Are Given; Commands Are Up to You

Although the only thing new or innovative about Z-Pilot may be its bargain-basement price, the game features some of the most spectacular graphics this side of the Amiga. As you maneuver your lightning-fast Z-Fighter through wave after wave of aliens, meteorites and UFOs, beautifully detailed terrain smoothly scrolls beneath your ship as you view all the action from above.

For every ten aliens you blast with your laser cannons, an energy unit appears which, if shot, releases an energy capsule. Chase and retrieve the green energy capsule before it disintegrates. Then, you'll receive an energy bomb that can be used to blast your way through a moving force barrier surrounding a transporter that takes you to the next level.

Z-Pilot has four increasingly difficult levels, each with its own unique terrain and combination of alien threats to your Z-Fighter. Level One, for example, takes place over a sprawling hi-tech complex covered with sharply outlined geometric structures. You'll face small meteorites and a variety of alien space ships that look like colorful finned rockets, tiny blue planets with their own orbiting moons, and spinning red satellites with yellow stripes. Contact with any of these, or the slow-moving projectiles they release, drain your ship's energy. While your energy is gradually replenished as long as you can stay out of the line of fire, when it's gone you lose one of your three Z-Fighters.

The second level features more of the same type of aliens. However, the action takes place high above a deep red planet with flowing blue rivers and plenty of big green trees and other vegetation dotting the countryside. Unfortunately, the enemy won't give you much time for sight-seeing. In addition to the Level One aliens, here you'll also face round space ships that look a little like orange slices, and purple flying saucers that chase your Z-Fighter and fire dangerous X-shaped missiles at you.

If you make it to Level Three, you'll find yourself battling aliens above a planet covered with ducts, vents and craters. This may be as far as you get because here you must face deadly motherships. Although these large ships move slowly over the planet's surface, they must be hit ten times before they're destroyed. Also, they fire missiles that automatically zoom in on your Z-Fighter. Even though it's possible to out-run and out-maneuver these missiles, they're very persistent and don't give you much time to collect the energy capsules you'll need to make it to Level Four.

The final level features a water-covered planet with large green islands. It is here that you can save the universe by collecting five energy bombs. When you do, the alien control ship appears and you must hit it with all five bombs to win the game. Of course, this is easier said than done because all of the most dangerous alien ships from the previous three levels reunite here and do their best to keep you from completing your mission.

Z-Pilot is strictly for arcade shoot-'em-up fans who love fast action and great graphics but aren't particularly concerned with things like realism, strategy, and the reasons behind their single-minded assault on the universe. Like most good arcade games, Z-Pilot can practically be booted and played without reading a word of instruction. Even if you do peruse the one-page instruction sheet, you won't learn that 1 can be used to pause the game and 2 gets the action going again: I discovered this almost by accident. For less than ten bucks, however, you won't find a faster-moving, better-looking arcade shoot-'em-up anywhere. *(Spinnaker Software, One Kendall Square, Cambridge, MA 02139. C-64/$9.95.)*

—BOB GUERRA
BOSTON, MA

SARACEN ..... B

Feel Like You've Played This Game Before?

Playing Saracen, Datasoft's action-strategy game, is a bit like Boulderdash, a little reminiscent of Ultimate Wizard and somewhat like solving a jigsaw puzzle.

The story line doesn't give away much about the game: Zealous young Chris- ►

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!

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tian adventurers have joined together to drive the Saracen infidels from the Holy Land. You, as Ilan the Crusader, are armed with a longbow and must make your way through 100 castle rooms, blowing away the Saracen chief in each before moving on to the next.

The castle soldiers are whirling colored snowflakes that cling to the walls of a room as they move about. (Remember the butterflies in Boulderdash?) In order to disintegrate the chieftain, you must find the grenade located on each level, place it beside him and shoot the grenade with an arrow.

That's the easy part, and getting there is 99 percent of the fun. Ilan can only carry one object at a time and arrows are his primary source of firepower. Each arrow points in only one direction, so Ilan must have a plan in mind before grabbing one of the arrows scattered around the rooms. Arrows can be used to kill soldiers, knock holes in walls, activate magic doors, open locked ones and explode "wall maker" blocks to turn them into bricks so that soldiers, cannonballs and other dastardly devices can't get out.

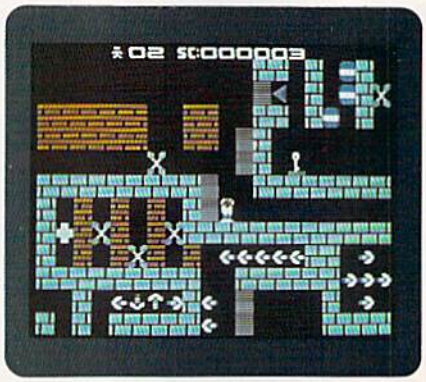
Doors are also opened by finding a key and then depositing it in a keyholder in another part of the maze—shades of Ultimate Wizard with its key and lock. Some mazes also contain one-way doors that let Ilan go in a chamber but force him to find another way out.

It may seem obvious by now that shooting everything in sight isn't the way to win the game. Fast travel isn't always desirable, either. If Ilan doesn't move about methodically, he'll find his quiver empty of "up" arrows just when he needs to knock a hole in the ceiling. There's no penalty for standing in one spot while contemplating your next move. If you're really stuck, hitting F1 takes you to the beginning of the screen, but costs you a life. There are five Ilans allotted at the beginning of the game, with an additional one awarded for each screen completed.

The ability to get farther by plotting than by joystick dexterity is one of the points that attracted me to Saracen. At times, however, there will be passageways filled with bouncing cannonballs, where Ilan's only hope is a quick two-step.

Another nice touch is the ability to start the game on any of its 100 levels. The first few are deceptively simple, allowing plenty of opportunity to practice shooting soldiers and look around at the designs of the walls—which may spell out game hints and messages in the lower levels.

But there's no time to read the handwriting on the walls after the beginning levels. Sometimes, opening up a wall to get to the necessary grenade unleashes soldiers, and Ilan has to hustle to reload his crossbow after each shot. Sometimes a safety zone is provided so that Ilan can avoid soldiers and cannonballs while surveying the territory. However, he can't shoot his longbow from a safety zone. It's a place for resting and waiting while determining the path of the guards, not a place for ambush.



Take your time—your next move could be your last in Saracen.

Solving the way to the next level—not racking up points—is the main object. The game keeps track of the score, but as an indication of its importance, the booklet doesn't assign values to doing in soldiers and doesn't award bonuses for finishing a maze in one minute instead of two.

Graphics are colorful and scrolling is smooth. Although the documentation doesn't mention it, the theme song can be shut off by hitting 0—thank goodness. There's no construction set for more screens, but the 100 on the disk should last awhile. In short, Saracen is all the fun of Boulderdash but without the falling rocks. *(Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311. C-64/$19.95.)*

—LONNIE BROWN
LAKELAND, FL

DELTA PATROL ..... A–

Hey, This Is One Tough Space Neighborhood To Hang Out in!

It was a dark and stormy nightmare. It was the night we patrolled Delta Sector. "Please," I said, as I booted up the disk, "not another shoot-'em-up, alien arcade game." And, after sitting through screen after screen, I pleaded, "Please—another shoot-'em-up, alien arcade game that's as good as this one."

Delta Patrol has only one entry level: survival. There's no saving games to disk, so you'll always start at the beginning, no matter how fast, far or fearless you've flown before. I'm sure many players would appreciate being able to skip screens that have been mastered.

The waves of attackers on each scenario occur in the same sequences. Learn the script; earn your stripes. Memorizing how things happen on the lower screens is a snap. On higher levels, you'd probably rather forget how it all happened.

Delta Patrol has more than 200 alien attack waves in 30 well-designed regions of space, and each makes you wonder what could be just beyond—and shudder at the thought of it.

Things start out easily enough: Your ship is on the left side of a pitch-black screen. Star-like white pixels flow slowly and smoothly from east to west. The first invasion of alien fighter ships, shaped like smoke rings, sally in just below the center of the screen. Move down, shoot 'em up—easy.

For this feat, you earn one credit. It can be spent by flying over the special wave of floating armaments and ship enhancements that follow each new set of attackers. Or, one credit can buy extra speed. If you had two credits, you could buy an increased rate of fire.

To make a purchase, fly over any blue icon. Try purchasing weaponry represented by the gray icons that are more expensive, and your ship explodes. Money talks; greed walks. Credits can't be saved, so buy when possible.

After the shopping excursion, another wave of aliens appears. Wipe out all the ships in each attack to earn a credit for the next shopping spree.

Explaining how to shoot all the aliens from this point on would be like describing how to perform Swan Lake or how to ride a bike. The sitting-duck smoke rings in the opening screen have been replaced by what seem to be multicolored, buzz-sawing comets. Worse yet, they shoot back! And, as you later learn, you have to douse their lights in order to earn enough credits to buy the necessary speed to get past the fast-moving maze of columns in the next wave. Those are then replaced by thimble-like objects that are bobbing and weaving in an ever-advancing line.

Meanwhile, back at the patrol ship, you've purchased the handy multiple-fire device that lets your ship shoot from rear, port and starboard. This is ►

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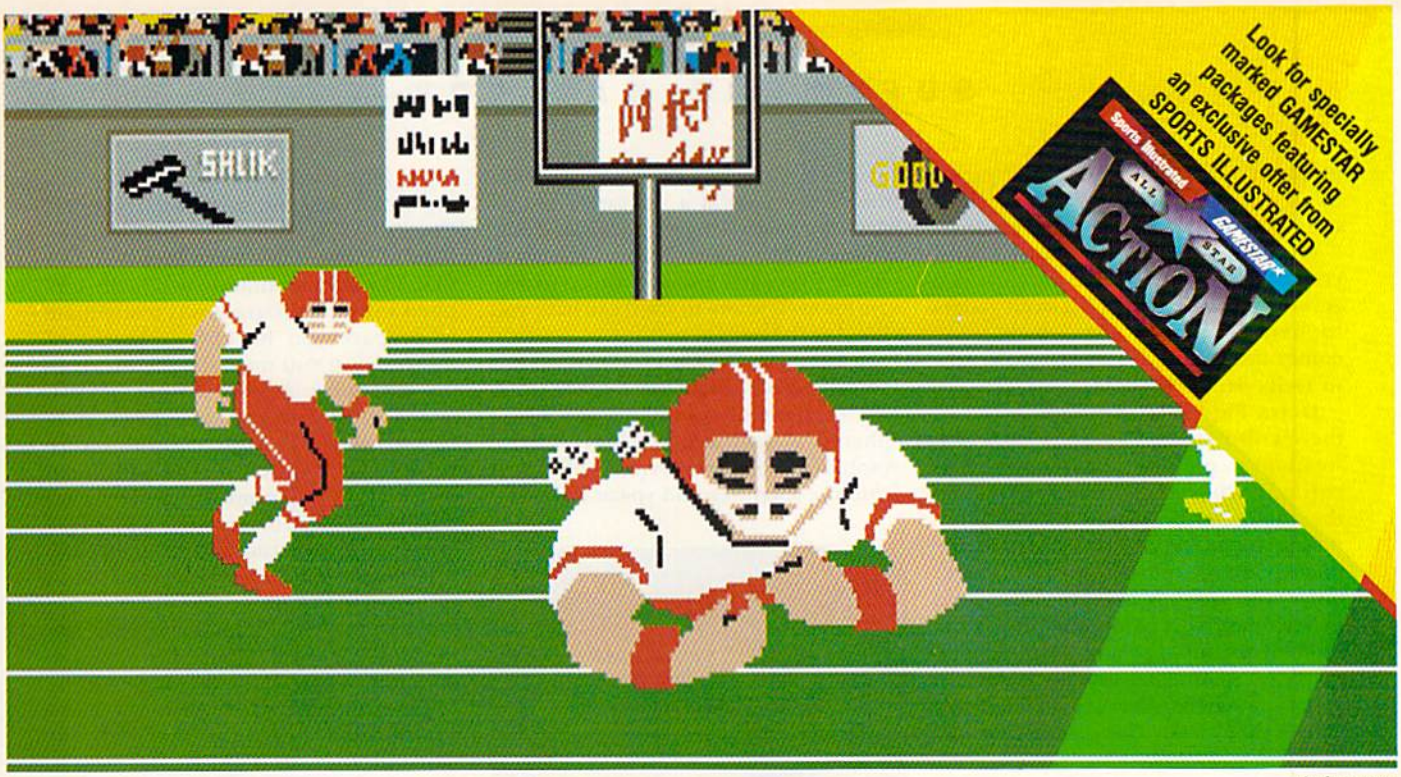

Amiga screen

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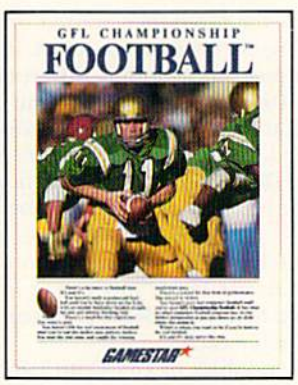

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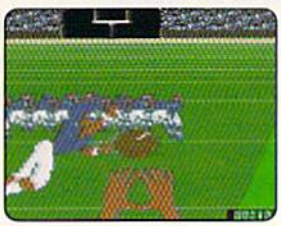
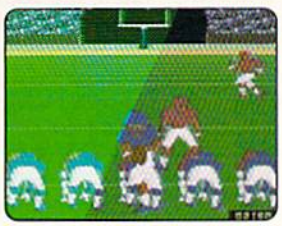
Amiga screen



Commodore 64-128 screen



Commodore 64-128 screen

Commodore 64-128 screen

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great for picking up the missed pieces of an invading wave: If you don't clean the plate, you won't get extra credits!

Multiple fire runs a measly three credits. The hardest item to earn is a seven-credit Supa Shield, a swell gadget to have when the alien mama ship comes around to see what all the fuss in Delta Sector is about.

Delta Patrol is shoot-'em-up, but there's also strategy in knowing which weapons to purchase. Scores can be recorded during the fighting sessions and the game can be played by two alternating ships. The graphics are good, the music catchy, and the scrolling is so quick and smooth that it's difficult to believe that 8-bit computers aren't the crest of technology any more. Thank goodness no one has told Delta Patrol's programmer that they aren't. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$19.95.)*

—LONNIE BROWN
LAKELAND, FL

DEF CON 5 ..... C+

Is It Real, Or Is It Cosmi's Simulation?

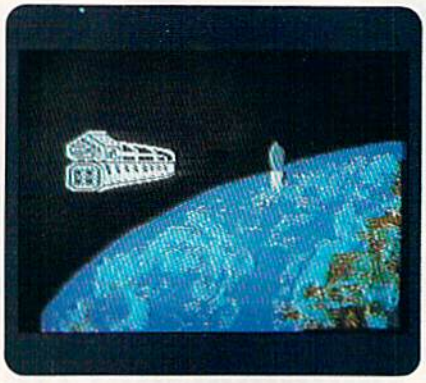
At the risk of sounding as if I'm making some political statement, I'll be a big fan of the United States' Strategic Defense Initiative (SDI) when it comes about—if it can perform as well under real conditions as Cosmi's Def Con 5 does in simulation.

Def Con 5 is touted as the "ultimate authentic simulation" of the Star Wars defense system. I think it takes itself a bit too serious in that regard, but in trying to simulate something as complex and far-reaching as SDI, Cosmi certainly deserves an "A" for effort.

The premise behind Def Con 5 is that you are in charge of a computer terminal connected to one of eight Microlink stations in the continental U.S. You must monitor def con (defense condition) status and take the appropriate measures to protect the U.S. from various land-based and space-based nuclear threats, anti-satellite mines, missile interceptors and a host of other nasties.

This is several thousand times harder than it sounds. From one Microlink station, you are privy to an immense amount of information. You must be able to activate reconnaissance satellites, orbital laser systems and various other defensive weapons at a moment's notice. There are several screen pages of designation codes, orbits and timetables to choose from, and knowing which to activate (or even where to start) can have you climbing the walls in no time.

In addition, Def Con 5 sports no less than seven plotting maps, representing various views of continents and hemispheres, as well as a disk full of high-resolution telemetry views of Earth from the satellites and space stations.



You'll find it's not easy to complete your missions in Def Con 5.

Once the program is started, and you have logged on to a Microlink station, you must complete four different missions. Def Con 4, the spacemine incursion, is the first. If you're successful, you proceed to Def Con 3, the interceptor attack; Def Con 2, launch detection and countermeasures; and finally Def Con 1, U.S. airspace violation by Soviet ICBM's. Each Def Con represents a different threat level, and you're limited in what Star Wars defense systems you can use for each.

The graphics of Def Con 5 are very good. Orbital telemetry views are loaded in directly off the reverse side of the disk—this, and the need to swap disks, can slow the game down a bit. Once a defense system has been activated, the scene switches to an orbital view where a number of defensive and offensive platforms may be selected, depending on the current Def Con. Here is where the graphics really shine: The plain-Jane screen of the Microlink station is replaced by a star's-eye view of Earth, which is often breathtaking, as well as very convincing. Sound, though basic in some areas, is more than enough to complement the graphics.

Wading through the documentation can be a bit tricky, as well as confusing. If you're the type who thrives on glancing briefly at instructions and then diving into a program, be forewarned: Def Con 5 is a difficult and complex simulation, and the instructions reflect that. The documentation originally supplied with the program was inadequate to prepare you for the onslaught of information you must handle throughout gameplay. At this writing, supplemental instructions have been published and will be supplied with future versions of Def Con 5. The additional instructions expound on the Def Con missions, weapons systems and other areas of the program, and will help clear up some of the more confusing aspects of the simulation.

My only valid complaint stems from the author's sense of fair play—a tough area to evaluate. A program should be difficult enough to challenge, yet not so difficult as to have you pulling your hair out after an hour. At Def Con 4, you must deactivate an anti-satellite mine, using a remote-controlled arm. While the mechanics of how to do this are simple enough, getting the satellite disarmed is another story. It took me over two hours to get through the first Def Con. I was ready to quit well before that. Some may see this as the carrot-on-the-stick approach to getting you into the game—I see it as frustrating. Until you've had a lot of practice, some of the Def Con missions will bait you with promise, then leave you with nothing but a joystick and sore palm.

Aside from the political overtones of the game and its difficulty level, Def Con 5 deftly combines strategy and arcade-style action in a convincing setting. It's an obviously well-thought out and original product aimed at mature, educated audiences. Def Con 5 will either challenge and captivate you for many hours, or have you staring regretfully at the sales slip. *(Cosmi, 415 N. Figueroa, Wilmington, CA 90744. C-64/$19.95.)*

—JOHN V. RYAN
BILOXI, MS

PRINTER'S ARTIST, PRINTER'S PATRIOT, PRINTER'S DEVIL ..... A–

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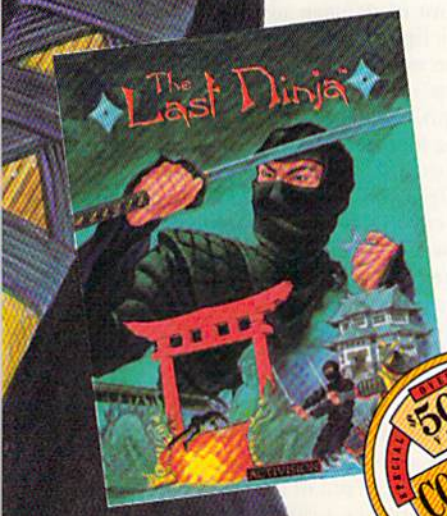

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that won't break the bank! BCI Software has a trio of programs designed for use with The Print Shop. With the conversion program included with each disk, they'll also be of benefit to Newsroom and PrintMaster owners.

At the heart of the package is Printer's Artist, a full-featured graphics program that lets you easily create a multitude of pictures. You can use this full-screen drawing tool to compose circles, lines and squares, copy or rotate sections of your picture, sketch freestyle, and more.

What makes this different from many programs is the inclusion of three modes for maximum versatility. In the Printer's Artist mode, it's a full-fledged drawing program with no special limitations imposed, making it much like Doodle! or KoalaPaint. Alternatively, you can select either Print Shop mode A for use with non-Commodore printers or mode B, Commodore graphics.

Only a portion of the screen is available when creating pictures for use with Print Shop. An outline feature lets you choose what portion of the screen you want to work in. Pictures are saved in one color only, because Print Shop itself doesn't allow for multiple colors. It's very much like using the graphics editor in the The Print Shop Companion.

Additional features include those that are standard on more expensive programs—mirror, move, erase, zoom and paint. I particularly liked the print option, with which I could output my picture directly from the program to a variety of printers. Both full-size and half-size prints can be made.

Printer's Artist makes it easy to add text to your graphics. All letters are supported directly from the keyboard, unlike some programs that require manipulation in order to print certain characters. An I/O option gives you the ability to view a directory and perform other save and load functions.

A detail that deserves mention is Convert-A-Graph, which enables you to quickly convert a Print Shop graphic to a Newsroom or PrintMaster graphic. This only works in one direction, however—you can't import Newsroom or PrintMaster pictures into Printer's Artist.

Both keyboard and joystick operation are supported. The instruction sheet is a mere two pages and basically explains the program's operation.

The overall look of Printer's Artist is pretty generic. It won't win any prizes for being the most visually appealing program on the market. There is a slightly irritating flicker to the cursor due, I imagine, to the way the program uses the interrupt routines. Despite its simplicity, I give the program high marks for versatility and ease of operation. You can't beat it for the price.

The Printer's Patriot graphics collection includes over 100 graphics, with patriotic themes, for The Print Shop (both modes). You'll find something for Scouts, fraternal organizations and the armed forces, as well as all-American images.

A screen dump from Printer's Patriot, showing the half-size print option.

Printer's Devil is also for use with The Print Shop. Over 125 designs and insignia are included. You'll find some that are particularly suited to header usage, including a music staff, chain and stars.

Both Printer's Devil and Printer's Patriot include the conversion program at no additional charge. So, even if you don't want to buy Printer's Artist, you can still expand your collection of graphics at a reasonable price and use them with other programs.

BCI offers some very worthwhile packages for your money; they deserve your consideration. *(BCI Software, PO Box 730, Ringwood, NJ 07456. C-64/$9.95 each.)*

—JIM GRUBBS
SPRINGFIELD, IL

TOP GUN ..... B

High-Flying Dogfights
And Aerial Action
Control the Screen

The motion picture *Top Gun* was one of the biggest hits of 1986. The computer game Top Gun, judging by its name, low price and relatively intriguing game play, should prove to be well received.

Actually, the computer software and the movie have little in common. The film was about the trials, tribulations and successes of a young man determined to be a top military fighter pilot. The software deals with only one aspect of the movie: It's an arcade-type strategy game in which one or two players engage in aerial combat with another jet fighter.

Although it may sound something like a flight simulator, this under-$10 program is a little too simplistic to accurately be categorized as such. True, the players use a joystick and keyboard to make their F-14 Tomcat perform basic flight maneuvers, such as diving, climbing, banking, accelerating and firing weapons, and the game perspective does put you in the cockpit of a jet, looking out over an array of instruments.

But the aircraft that players are supposed to pilot will literally fly itself. You don't really have to worry about airspeed, compass direction or altitude as you do in the typical flight simulator. Setting your target sights on your airborne foe and making sure you keep your plane out of his cannon's cross hairs are your biggest worries in Top Gun.

In other words, this is a shoot-'em-up designed to make computer gamers feel as though they're in an advanced jet fighter. That's not a bad premise for an inexpensive computer game, and in this case it works pretty well. Top Gun offers just the right blend of action, strategy and challenge to make it enjoyable.

After what seems like an interminable loading period, the player is presented with a split-screen image of two fighter planes simultaneously taking off from different aircraft carriers. The view then switches to another split screen, this time presenting mirror-image views from inside the cockpits of both airborne fighters.

At the very top of each screen is an altimeter. Eight instruments at the bottom provide important information including the type of weapon being used, the amount of damage sustained, the speed of the fighter and the relative proximity of the enemy. The largest part of each screen represents the view outside the cockpit, with an artificial horizon and targeting tools superimposed.

Basic maneuvers are controlled by simple joystick movements, and three keys control acceleration, deceleration and weapon selection.

The trick, and challenge, comes from trying to monitor all indicators, maneuver your jet, seek out the enemy and avoid his weapons all at once—that's what it'll take to become a Top Gun.

Fortunately, you have plenty of opportunities to practice your flying techniques without having to worry about being blasted out of the sky. By selecting the two-player option and playing by yourself, you can work on mastering ►

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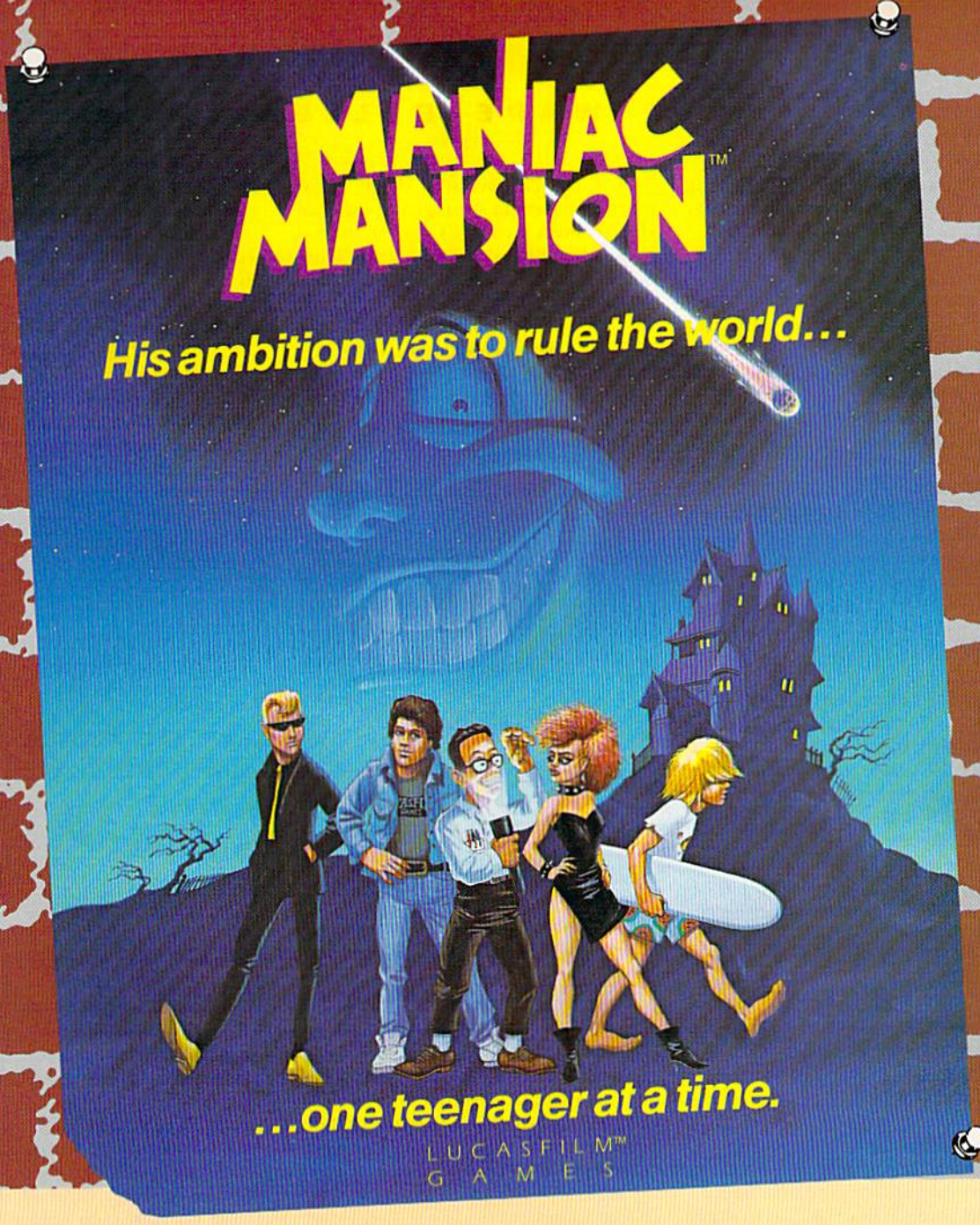

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the operation of your F-14 and tracking down a foe without having to worry about him shooting back at you.

Later, after you've got some flight time under your belt, you can plug in a second joystick and go head-to-head with a real foe, or select the one-player option and let your Commodore control the enemy. Both fighters start out with three lives.

Graphics-wise, the cockpit view isn't particularly dazzling. It consists basically of the dotted horizon line and the targeting sights on an otherwise blank screen. There's no background image, such as sky and clouds above or sea and land below. The only time anything else appears on the screen is when you get close to the enemy you're pursuing. It's not particularly difficult to find that enemy, since in theory he's also pursuing you.

If your foe is far away, his jet will at first appear on screen as little more than a dot. As you close in for the kill, you'll see the actual vector-type image of a jet fighter getting larger and larger.

If your first mission is a success and you shoot down the enemy, your next one will be slightly more difficult. The third mission is the hardest. You'll be going up against the best pilot the enemy can throw at you.

If you like shoot-'em-ups, you'll probably enjoy Top Gun. Its graphics, though somewhat sparse, are decent, and a great musical theme accompanies the beginning of each game. The program's biggest drawback is that it doesn't always capture or convey the feeling of actual flight.

On the other hand, I suppose flying a real F-14 at supersonic speeds, using advanced instrument guidance doesn't really feel as much like flying as piloting a Piper Cub. Considering its price, Top Gun isn't a bad way to earn your wings. *(Thunder Mountain, 3444 Dundee Rd., Northbrook, IL 60062. C-64/$9.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

BUCKS! ..... C+

Do Not Pass Go,
Go Directly Home
To Your C-64!

The renowned board game of Monopoly appears to be experiencing a sudden surge of new popularity. One indication of this is the recent publication of *Winning Monopoly*, a book that goes into great technical detail in exploring successful strategies. If this Parker Brothers product's star is indeed rising, then Bucks!, a C-64 take-off from Bear Graphics Software, should also prosper.

From one to six players can compete in Bucks!. The program recreates Monopoly's basic structure with a variety of different properties. As in the original, the majority can be bought, sold and mortgaged. The equivalents of Monopoly's "Go Directly to Jail" cards and its payment of a salary as "Go" is passed are also present.

A race underway at the Dopimup Racetrack in Bucks!

But Bucks! boasts other features that give it a distinctive and offbeat flavor. For example, a hard-playing real estate mogul can frequently pause to shoot dice or bet on horse races. In fact, a track devotee can even buy and run his own string of thoroughbreds. The program also includes a brokerage house that buys and sells stocks, as well as certain stores that can collect money from players, even when they're far away.

The game has other elements that Parker Brothers probably never even considered using. For example, the software occasionally declares martial law, which freezes the movements of all players over a number of turns.

And Bucks! is an arsonist's paradise, with fires frequently destroying properties that are soon replaced by new and entirely different investment opportunities. However, a cautious player can purchase insurance to protect himself from this type of disaster. Health coverage is also available to guard against more personal misfortunes.

Clear, detailed written instructions aid the generally straightforward gameplay. However, the program does cause a bit of confusion by occasionally refusing to display the locations of the properties. Taking some notes in anticipation of this could be a wise move.

The game's sound effects are rather pedestrian, and its graphics are generally static and unimpressive. But some players may appreciate this lack of sensory flair, since in some odd way it reproduces the atmosphere of its non-electronic predecessor.

Fans of Monopoly who can tolerate some rather bizarre twists to its classic scenario and who appreciate the option of single-person play will enjoy Bucks!. It makes an interesting and somewhat eccentric companion to an honored gaming institution. *(Bear Graphics Software, PO Box 12286, New Brighton, MN 55112. C-64/$19.95.)*

—WALT LATOCHA
OAK PARK, IL

DAN DARE: PILOT OF THE FUTURE ..... B+

Tough Plot . . .
But You're a
Tough Guy

Okay, when that creep, Mekon, broke into a Dan Dare TV appreciation special and announced the launching of an A-bomb-filled asteroid toward Earth, that got your dander up. But when, upon reaching the asteroid and beginning a search for an entrance, two of your crew are snatched by the green fiend's Treen henchmen—well, that's really asking for it! As hero, your mission is to rescue Jocelyn and Digby, sabotage Mekon's Control Dome, and escape on your ship before the whole place is blown to space dust.

Dan Dare: Pilot of the Future is a joystick-controlled, animated adventure that actually succeeds in playing much like a comic strip reads. So, as you move Dan down a ladder next to some plants in an underground river, a message "Dan sees some reeds" might appear. Naturally, you cut a few stalks. Having already tried swimming, only to be informed that "Dan can't breathe under water," you quickly figure a use for the reeds. In fact, the correct choice is usually fairly obvious. The trick is to notice and approach items that might be helpful.

Except for 24 grenades, useful only on the surface or in Mekon's chamber, Dan is unarmed, and so must resort to fisticuffs to polish off any Treens that get in his way. As you guide Dan's blows, ►

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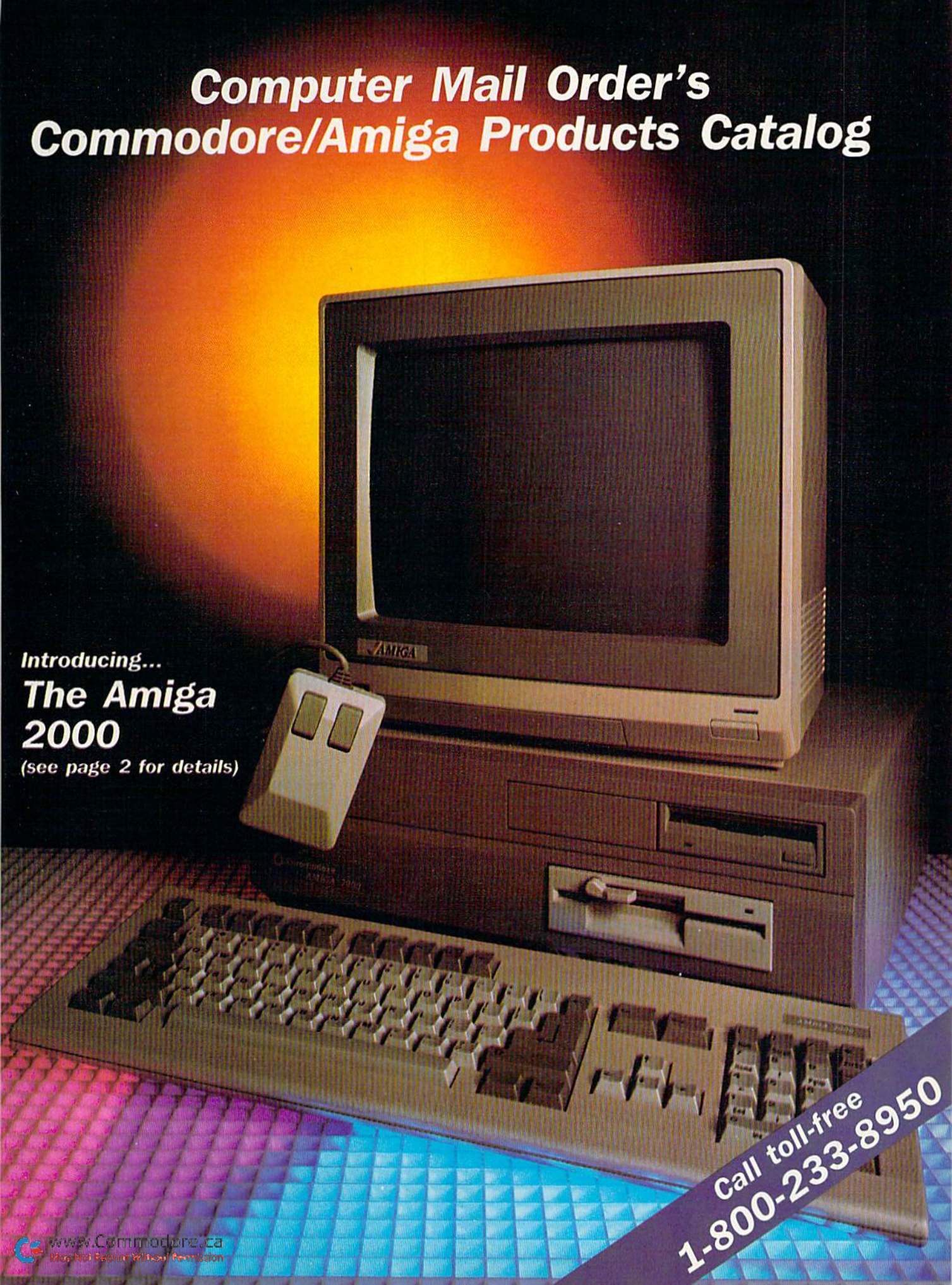

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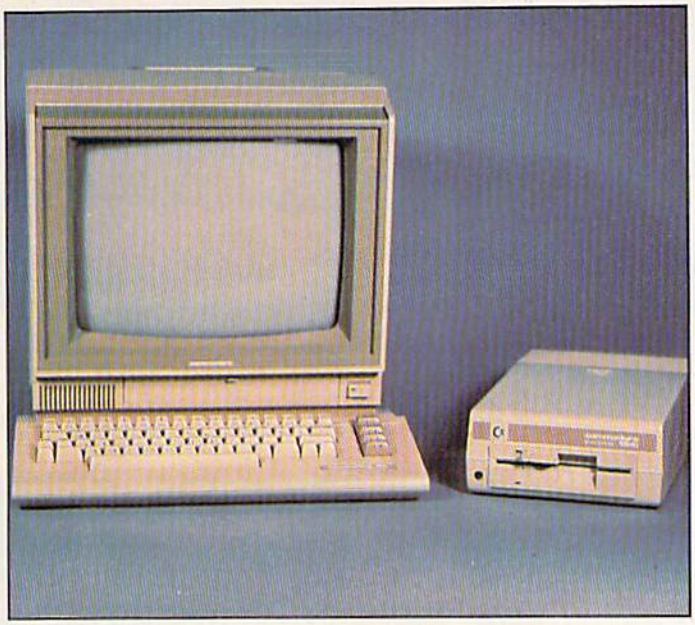

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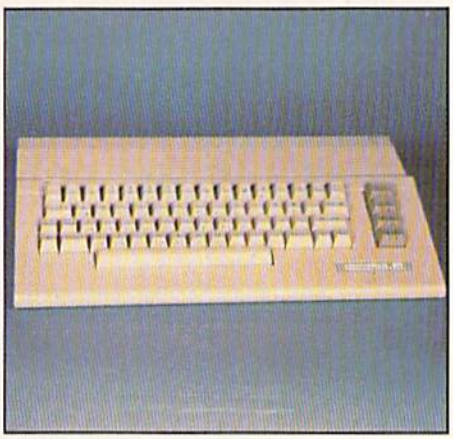

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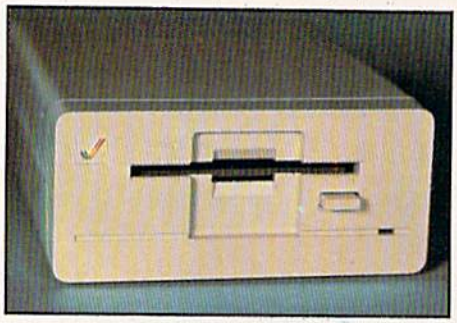

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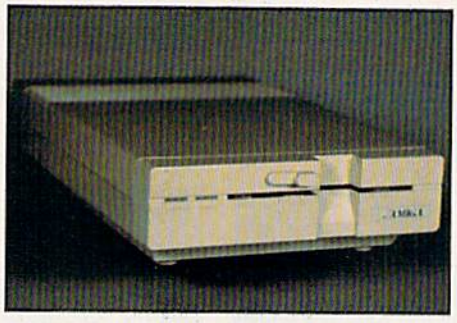

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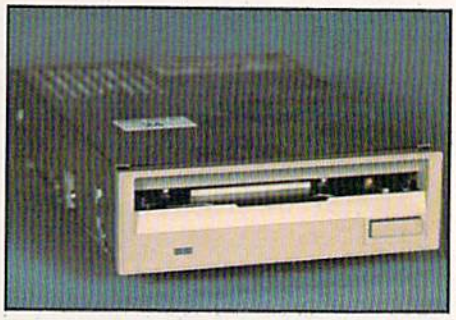

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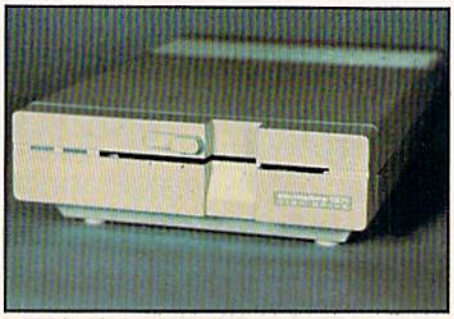

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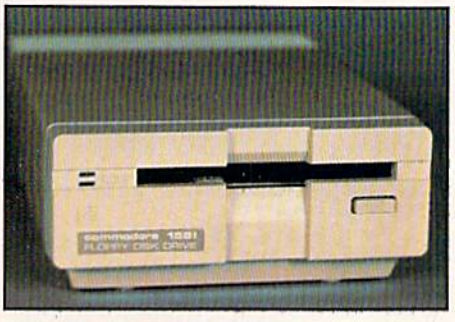

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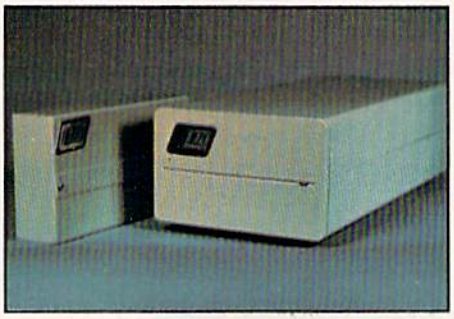

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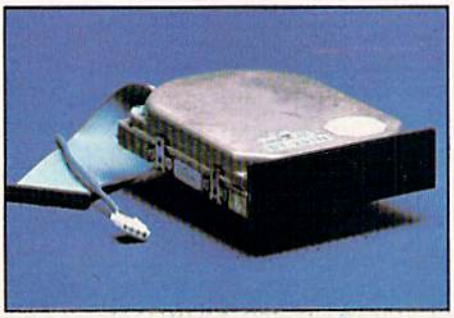

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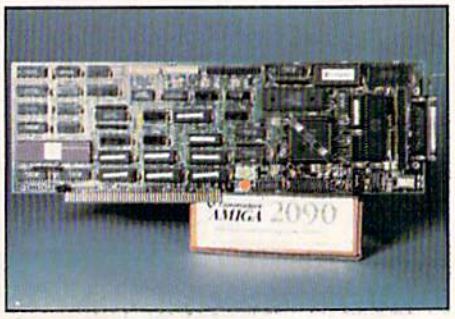

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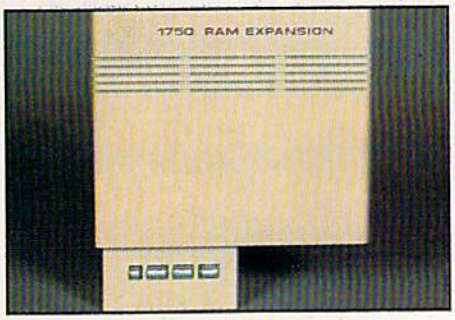

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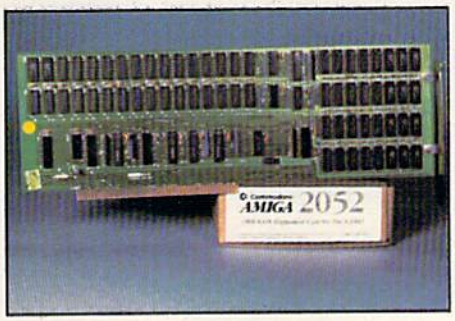

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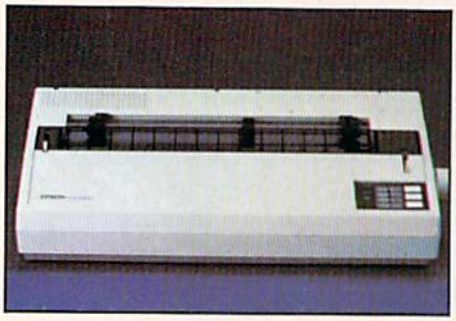

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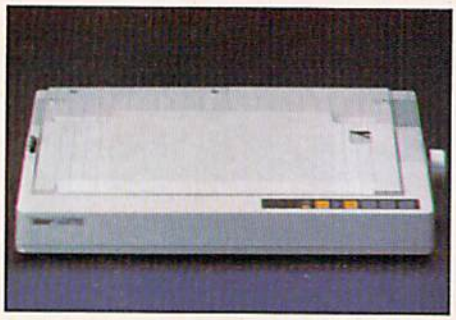

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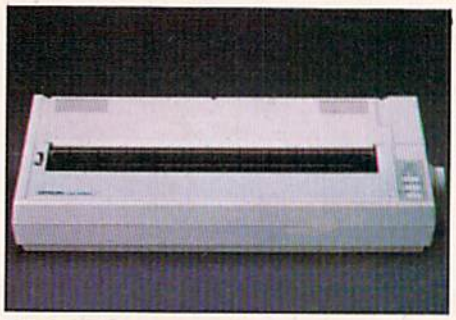

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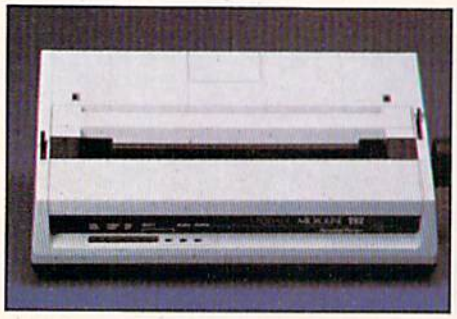

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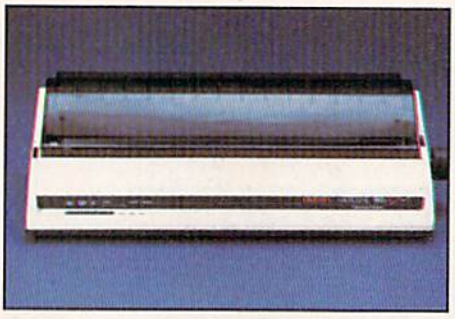

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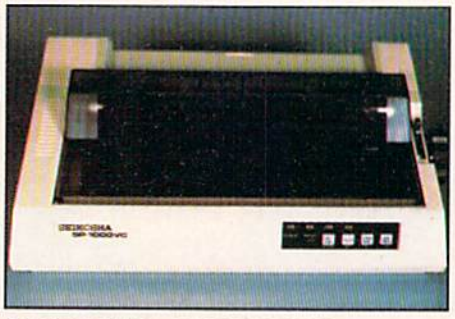

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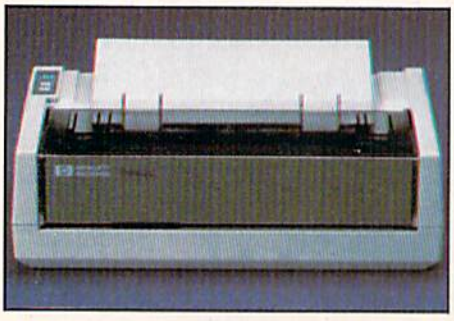

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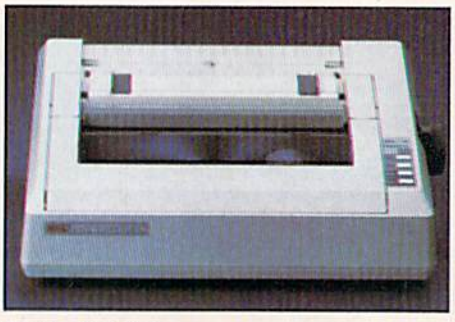

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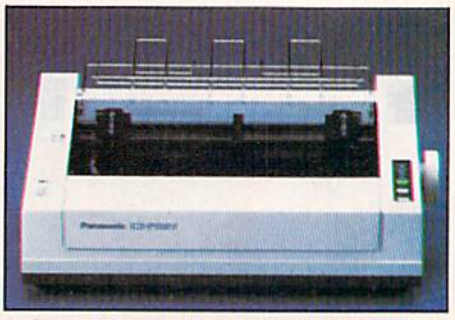

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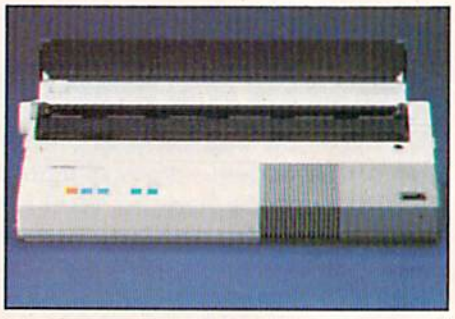

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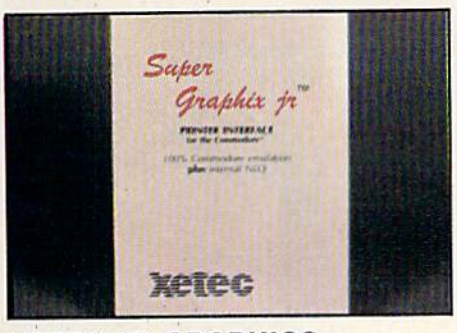

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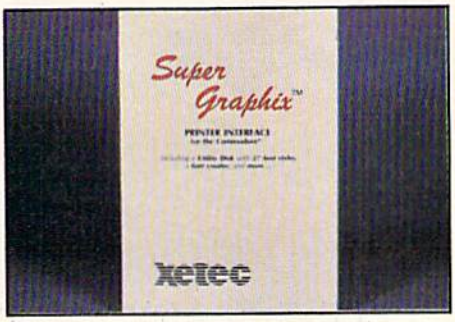

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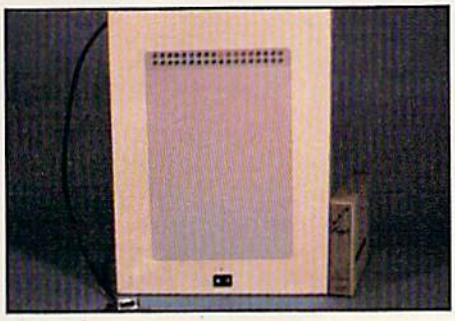

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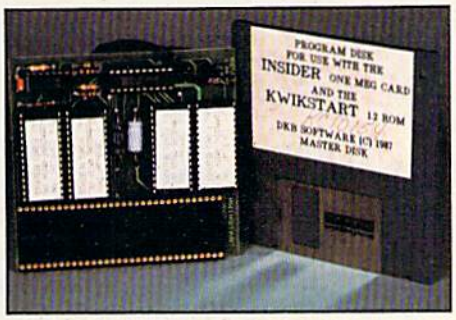

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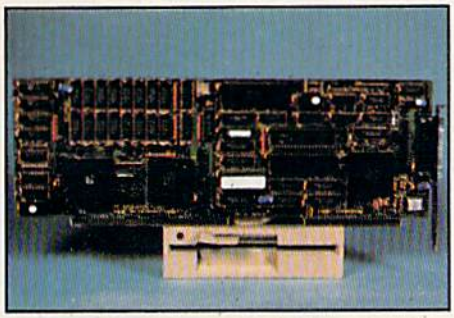

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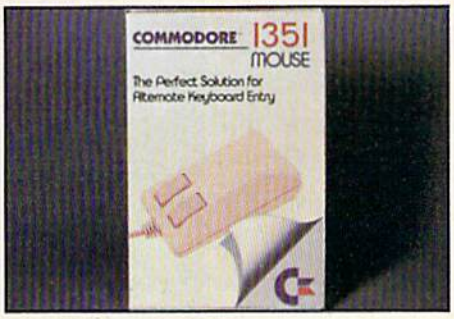

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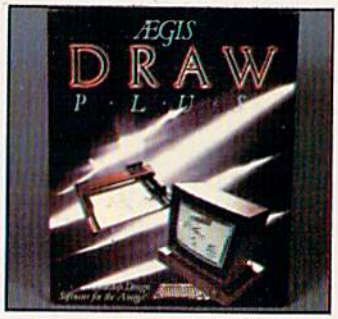

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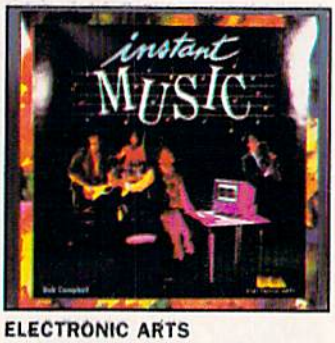

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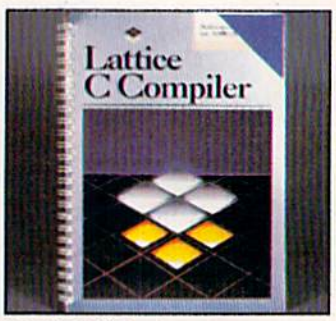

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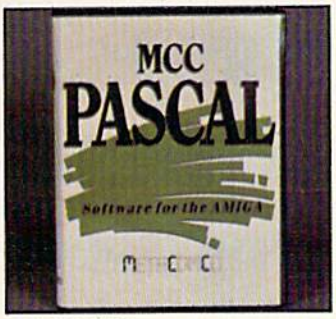

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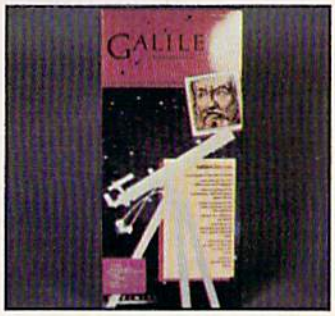

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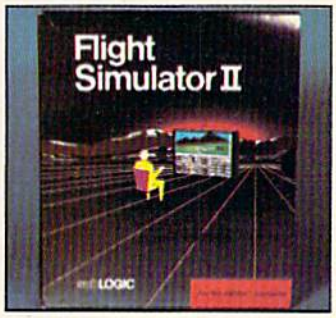

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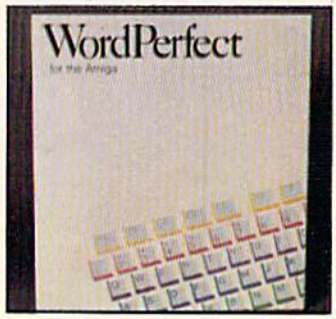

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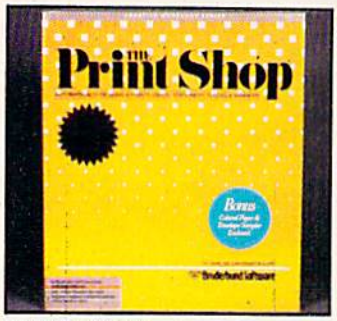

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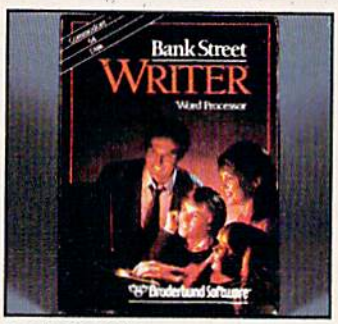

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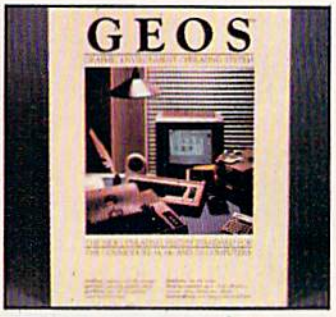

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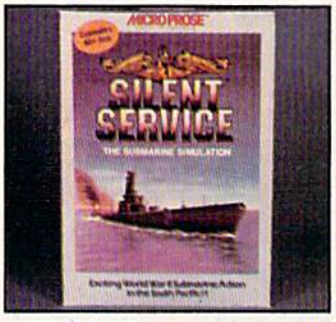

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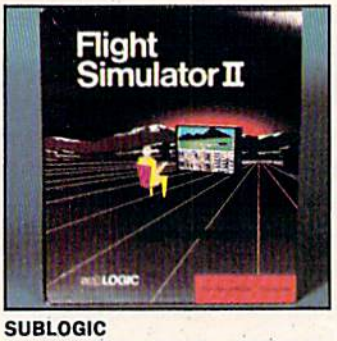

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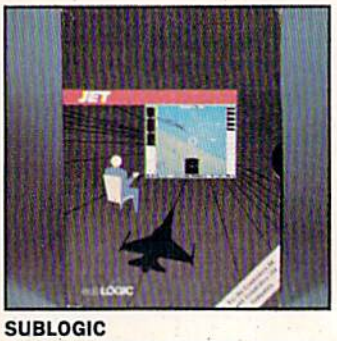

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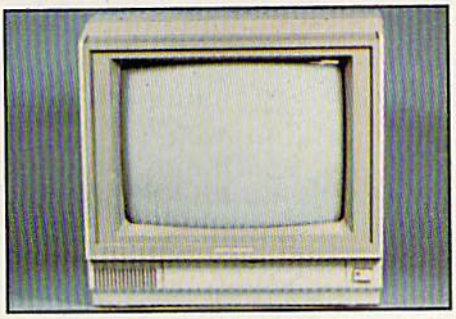

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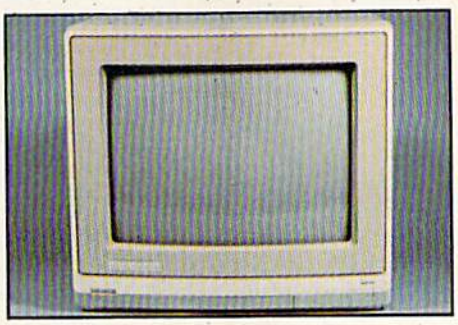

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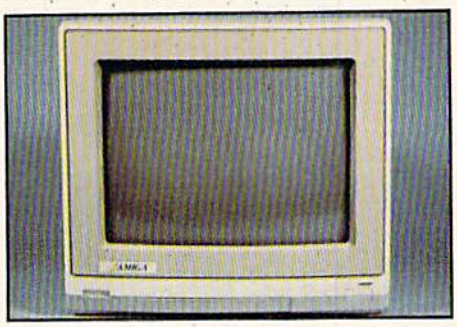

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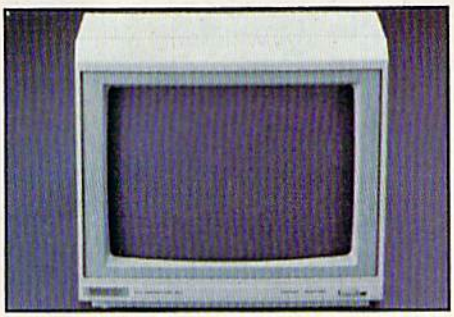

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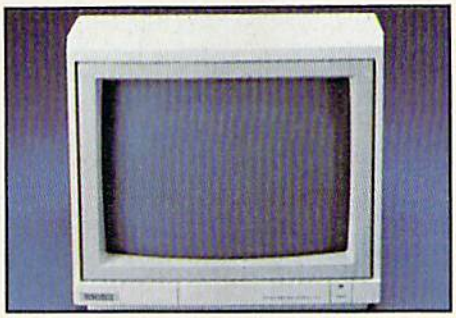

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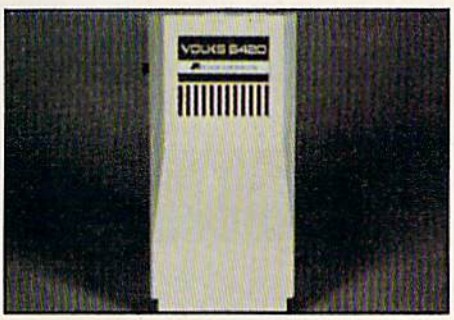

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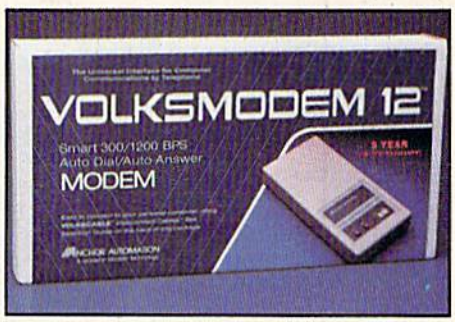

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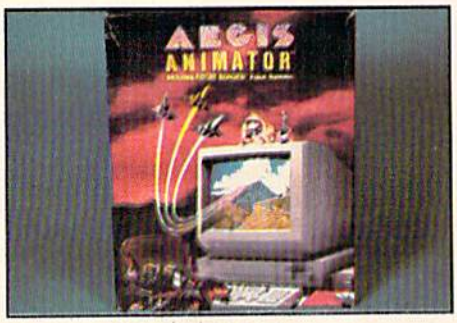

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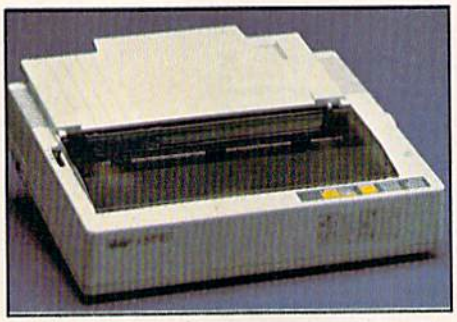

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an energy meter shows combatant charge levels. When the Treen's level drops to zero—poof!—he's gone. The same, unfortunately, is true for Dan, so you need to avoid unnecessary combats.

Assuming your Treen-trashing technique is up to snuff, the main barrier to success turns out to be Mekon's asteroid complex itself. While the labyrinth of caverns, cells, laser guides, and control rooms is fun to explore, it's also large enough to get lost in. Somehow, you must free your comrades, set up a series of guides to direct a laser blast at the door to Mekon's chamber, and complete the rest of your mission before the on-screen clock shows 1300 hours. Otherwise Earth is in for some real "hard rock" with you and your pals as part of the lightshow!

Featuring quality artwork, smooth animation, and good sound, Dan Dare is very entertaining, but deceptively tough—one of those adventure quickies that swizzles you into numerous replays because victory always seems so near. With mapping, the 25 minutes allotted is plenty of time, if you know what you're doing. Sure, this one's no piece of cake—if it were, they wouldn't have called on Dan Dare! *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$19.95.)*

—JEFF HURLBURT
HOUSTON, TX

DESERT FOX ..... B+

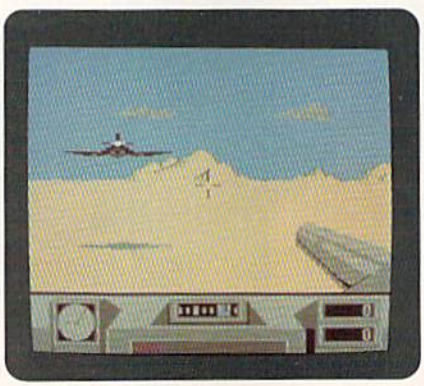
An Historical Simulation At an Historical Price

While Desert Fox makes an attempt to convert the confrontation of Rommel's Afrika Korps, Hitler's Panzer division and the British North African command into a computer exercise, the accent is on fun and games rather than on accurate simulation. But, the game succeeds by being based on historical fact.

Thankfully, there are practice routines to help you sharpen your skills before engaging in combat. These include a Stuka Attack, during which your tank must fight off waves of divebombers. They come in low over the desert hills, moving from side to side and growing in size until just overhead, where they release bombs.

Rapid fire isn't possible because it takes time to reload your gun. However, you can try firing and then swinging your sights onto the target to score a hit. To aid you in defense, there's a radar display at the lower left of the screen and a thermometer-type display at low center that informs you of the damage sustained. At lower right, your accumulated points are shown.

Next is the Tiger tank exercise, where an enemy tank runs back and forth in your field of view, hurling shells that grow ominously in size just before they explode against your tank. Because of the Tiger's speed and its ability to turn suddenly on a dime, you'll have your hands full.



Looking out from within your tank in Desert Fox.

In Ambush, you speed down a narrow canyon, destroying gun emplacements that line the walls. In Minefield, you race forward over a desert littered with more anti-tank mines than were used in the entire war, attempting to destroy them with gunfire before your tank runs over one.

Last of the challenges is Convoy: you now have two guns to alternate by pushing your joystick left or right while firing. Stukas are destroying a truck convoy and you must shoot them out of the sky while trying to avoid shooting down any of your own Spitfires—it isn't easy.

Once you've had enough practice, you can choose to play the game at any of five levels. Your screen becomes a map of North Africa and your position is indicated by a tank, while that of Rommel's Korps is indicated by a swastika. At the right of the screen are four icons to select from: Air Strike calls in Spitfires against the Korps position; Zoom lets you see the fuel and supplies contained in the depot; Radio has you listening in on voice transmissions from the Germans; and Move lets you move in the direction of those transmissions.

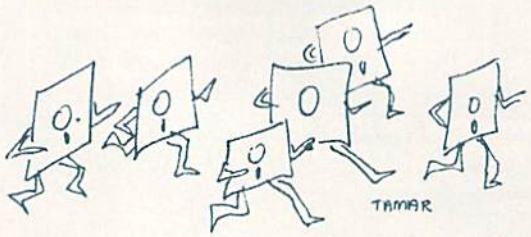
Radio is the key to playing the game. In that mode, you move your tank's antenna until you pick up a voice-synthesized, garbled message with a plausible German accent. One or more of the words tip you off as to the nature of the challenge.

When your tank icon meets that of the Germans, the screen suddenly changes and you find yourself in the midst of arcade action. At the lower right-hand side of your screen, a ticking clock warns you of the time remaining before the depot will fall into enemy hands. You can also replenish your fuel or repair damage to your tank by visiting one of the depots that has the necessary supplies. The object of the game is to save all the depots.

Graphics are good with large foreground objects that give a feeling of depth and dimension to the screen. Documentation is short, to the point and illustrated with the various playing screens. The bulk of the booklet is a synopsis of the North African campaign—discussions of strategy, tactics and weapons.

With the Avantage trademark, Accolade seems determined to provide good games at good prices. Although some titles are re-releases, we can welcome them and applaud the effort that brought them back. The new games will delight all, while the reprints will ensure that new C-64 users won't miss some of the golden oldies. *(Avantage, 20813 Stevens Creek Blvd., Cupertino, CA 95014. C-64/$14.95.)*

—ERVIN BOBO
ST. PETERS, MO ■



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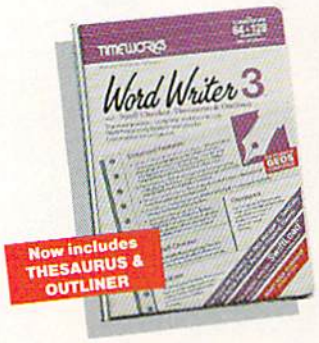

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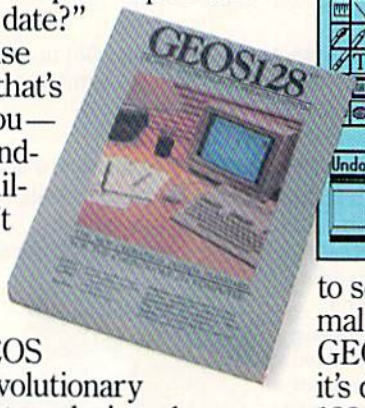
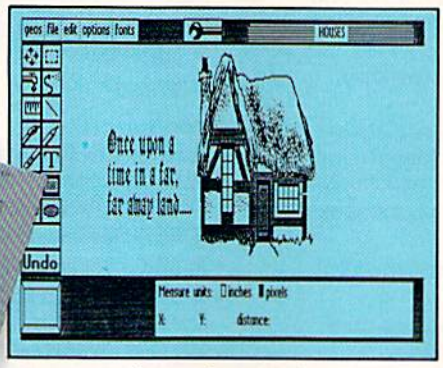
IS YOUR 128 OR GROW

So there you are, furiously working away at your Commodore 128, thinking everything is just peachy, when all of a sudden, it hits you. That haunting, hollow, horrible question that every computer owner must inevitably face:

"Is my computer up to date—or out of date?"

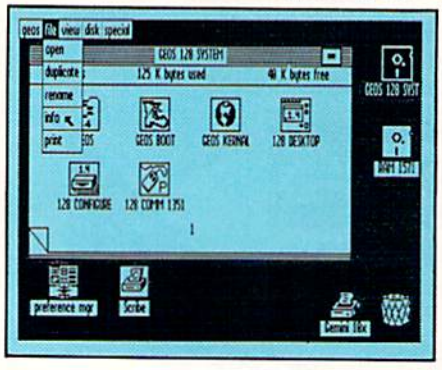
If you use GEOS 128, that's a question you—or your grandchildren's children—won't ever have to worry about. Because GEOS 128 is the revolutionary software system designed to push your hardware to new limits. Unleash its full power across a full 80 column screen. And expand its capabilities for years to come.





We should have installed disk brakes.

Loading up with GEOS turns your 128 into a mouse-driven maniac that loads, processes and saves everything up to seven times faster than normal. Part of that's due to the GEOS disk Turbo, but most of it's due to the fact that GEOS 128 doesn't treat your 128 like a C64.



You see, by recognizing your machine as a 128, GEOS 128 operates at a full 2 MHz, instead of 1 MHz. So you get twice the speed. Twice the power. And since GEOS 128 also supports the quicker 1571 and 1581 double-sided disk drives—and the 1750 RAM expansion unit—there's no telling how much faster that puppy will fly.

Fast and slick with mouse or stick.

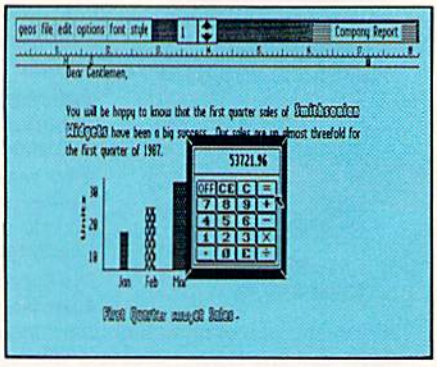
Using GEOS is ridiculously simple. All you need is a mouse or joystick, and a keen ability to point and click. Everything else is pretty much a matter of reading *menus* (a technical term for "little lists of things"), or selecting *icons* (a technical term for "little pictures of things"). It's sort of like talking in sign language.

For example, if you want a document for word-processing, you point to the icon that looks like a stack of papers. Click your mouse and bingo—you're in the file. If you want to erase the file, you drag the stack of papers over to the little waste basket and click your mouse.

Poof. That's about as tough as it gets.

Working within the system.

Learning where things are in GEOS is pretty simple, especially if you've ever sat behind a desk. Because that's exactly how we designed



GEOS 128.

You keep your documents and graphics in files; everything else stays right on the desktop: the notepad, the calculator—there's even an alarm clock. In fact, the only thing our desktop

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GROWING UP ING OLD?

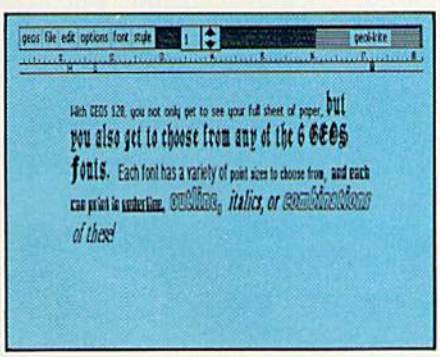
Now, we realize that's a lot to pack into one GEOS package. But as long as we're packing it in, we might as well let you know something else: There's more.

doesn't have is a place to put your feet when the boss isn't around.

But not only does GEOS give you a place to write and draw, it actually helps you write and draw better. Because unlike your basic office model, our desktop comes with geoWrite and geoPaint built right in.

With geoWrite, your way with words leaves people speechless, as they watch you effortlessly cut, paste and move entire blocks of copy anywhere on the page. And since geoWrite comes with different fonts in a variety of styles and sizes, your documents become even more dazzling.

With geoPaint, you can draw designs. Create with colors. And tantalize your tastes with tons of tones and textures. Invert, rotate or mirror images.



Then place them wherever you want: either in your geoWrite document, or in your GEOS Photo Album for later use.

But no matter what kind of masterpiece you create, you always get to view it on a beautiful, 80 column-wide screen. No more scrolling left to right. With GEOS 128, what you see really is what you get.

The more you put into your system, the more you get out of it.

Of course, when we say that GEOS 128 has far-reaching implications, we're not kidding around. Every GEOS 128 package includes free QuantumLink software, which hooks you (via modem) into a nationwide network of Commodore people just like you. There's even a service that will Laserprint your documents for you.

The older it gets the better it looks.

It's true. Because there are always new GEOS applications just waiting to jump off the shelves and into your 128. Packages like geoDex and geoFile, for keeping addresses and data straight. Fontpack and Writer's Workshop, for tweaking text with that special, extra touch. And, of course, geoCalc, a full-featured graphics spreadsheet for all you number freaks.

They're just the first in a long line of GEOS applications that are constantly being developed to keep your 128 up to date.

So if you'd rather have your 128 grow up than grow old, load up with GEOS. You owe it to yourself. You owe it to your 128.

Heck, you owe it to your grandchildren.

To order call 1-800-443-0100 ext. 234

GEOS 128 $69.95

(California residents add 7% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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GEOS 128

Berkeley Softworks

The brightest minds are working at Berkeley.

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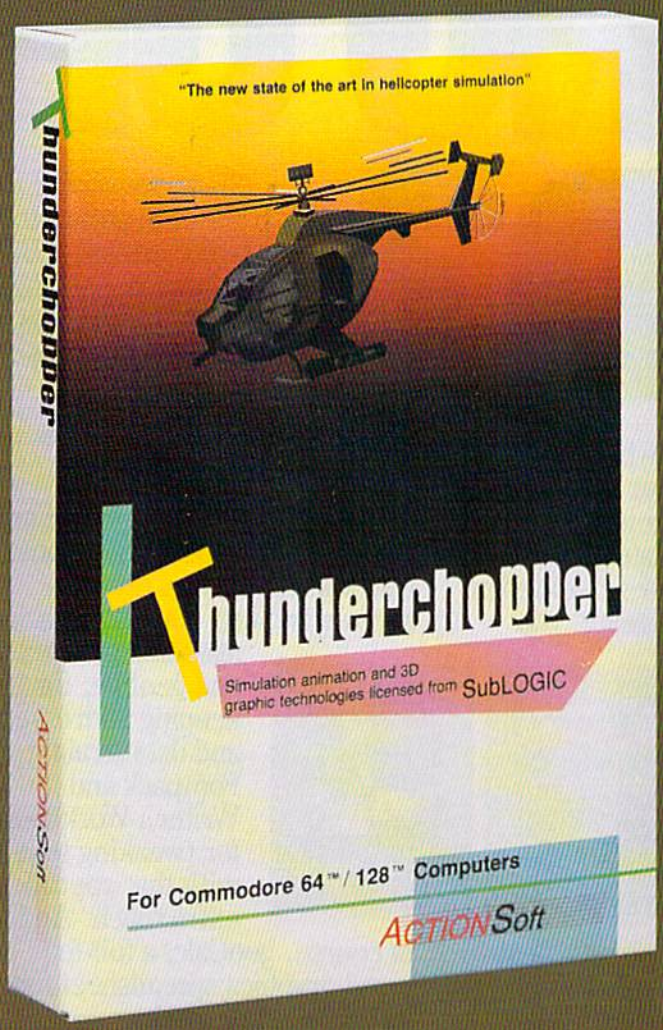
FINALLY, A CHALLENGING HELICOPTER



Sure, our competitors have their own versions of what they believe to be realistic helicopter simulations. But they're either too **SUPERSIMPLE** or they make helicopter flight a true **HARDSHIP**. Only ThunderChopper's advanced flight systems, graphics, and game-playing strategies provide the perfect combination of challenge and fun.

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Better Engineering at a Better Price

ThunderChopper puts you at the controls of an advanced Hughes 530MG Defender. This high-performance scout/rescue/attack helicopter has the enhanced power and controllability not found in today's helicopters – or helicopter simulations. ThunderChopper's combination of power plus control lets you land on helipads or rooftops with ease. With enough experience you'll be ready to test your skills in a variety of dramatic escort, land and sea rescue, and combat scenarios.

High-speed 3D animated graphics, courtesy of SubLOGIC, offer superb out-the-window views in day, dusk, and night flight modes. ThunderChopper's sophisticated instrument panel lets you scan all vital information at a glance. An onboard flight computer provides mission instructions and pilot performance feedback. Advanced instrumentation includes Forward-Looking Infrared, CO2 laser radar, and zoom television. Armament consists of TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets – ThunderChopper's 750-horsepower jet turbine and precise controls provide the power and maneuverability to use them all effectively.

Superior programming and documentation design gets you up and flying in minutes. Flight techniques and combat strategies by Colonel Jack Rosenow, USAF (Ret.) provide all of the helicopter action and realism you've been looking for.

From simple landing practice to the most dangerous combat mission, ThunderChopper is the perfect combination of challenge and fun. ThunderChopper, truly generations ahead of the pack!

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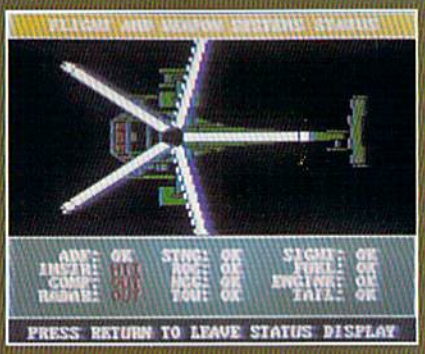
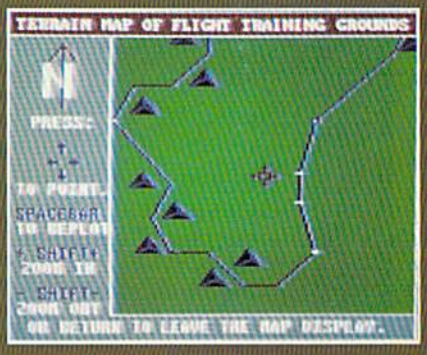
SIMULATION THAT'S ALSO FUN TO FLY!



C64 Screens shown. Other computer versions may vary.



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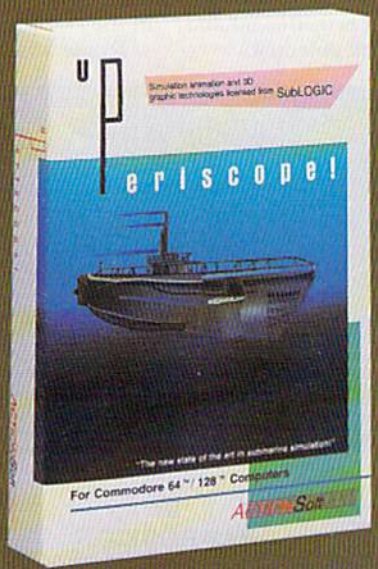
And don't forget Up Periscope!, the new state of the art in submarine simulation. For the ultimate in submarine action and realism, nothing else even comes close.



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Or write or call for more information. ThunderChopper is available on disk for the Commodore 64/128 and AppleII computers. Up Periscope! is available for the C64/128 and IBM PC. For direct orders please specify the program and computer version you want. Enclose $29.95 plus $2.00 for shipping (outside U.S. $6.25) and specify UPS or first class mail delivery. Visa, Mastercard, American Express, and Diners Club charges accepted.

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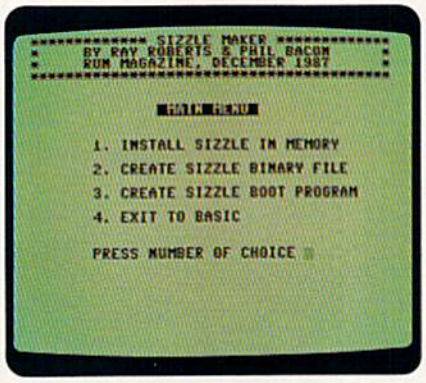
SIZZLE!

Load your programs up to 500 percent faster with this versatile 1541 fast-loader and boot-maker.

COMMODORE'S 1541 DISK DRIVE, as most C-64 users know, is slow at transferring data from the disk to the computer. You might guess that the problem lies in the serial interface between the drive and the computer. A serial bus transfers a single bit of data at a time, while the more common parallel bus transfers a full byte (8 bits) at a time. The serial configuration was apparently chosen by Commodore because it's less expensive to manufacture.

Curiously enough, the serial bus is not the cause of the slow data transfer. Indeed, the bus is capable of transferring data at up to 12 blocks per second. The reason it doesn't is that the built-in software that controls loading and saving is inefficient and doesn't use the hardware to its full potential.

The result is that during a normal load, the 1541 transfers about 1.5 blocks each second, and a 100-block program file will load in about 65 seconds—which is about eight times longer than it theoretically could.



FAST LOADERS

It didn't take long for some programmers to figure out the problem, and "fast-loader" programs soon became available. They work by redirecting the load vector in the computer's memory to the fast-loader. When you enter a Load command, a portion of the fast-loader is sent through the serial bus to the disk drive RAM, where it's used instead of the normal, inefficient load routines. Once there, it works in conjunction with the rest of the fast-loader program, still in the computer's memory, to transfer the data.

To use a fast-loader, all you have to do is load it and issue a SYS command to redirect the load vector. Thereafter, loading speeds will be two to five times faster than normal, de-►

By
RAY ROBERTS
and
PHILIP BACON

ILLUSTRATED BY JOSE CRUZ

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"Sizzle creates a variety of FastDOS loaders—one for each of your applications programs."

pending on the size of the program. Fast-loaders are able to read two blocks every time the disk spins one revolution. They don't quite reach the theoretical limit, because it takes time to send the program to the disk drive and to move the head from track to track, but there is surely a significant improvement.

The problem with fast-loaders is that they reside in the computer's memory. If you load a program that needs to occupy the same address as the fast-loader, everything will come to an abrupt halt in the middle of the load.

At other times, a program will fast-load without any difficulty, but if it saves data in the same areas as the fast-loader, it will corrupt the fast-loader, and the next time you attempt a load, you'll probably end up with a "frozen" computer. These problems are exasperating and lead many users to put up with the normal slow speed of the 1541.

The solution to this quandary is my program, called Sizzle. It'll create a variety of FastDOS loaders—one for each of your application programs—and they'll operate at two to five times the speed of the normal 1541.

Program Operation

Type in Sizzle, using 64 Perfect Typist from the How To Type *RUN* Listings department in this magazine. Then save it to disk *before* you run it. When you run it, the main menu will offer four options.

The first option pokes the fast-loader into memory—at any starting address you designate—and activates it. This is just a quick way of enabling a fast-loader without having to boot it from the disk.

The second option generates fast-loader program files with various starting addresses that you designate. With this option, you're no longer locked into using a single fast-loader. You can create a number of them, then each time you need one, choose one that won't conflict with your application program.

If you created a Sizzle FastDOS that resides at address 49152, you'd load and activate it with the following sequence of commands:

```
LOAD"SIZZLE.49152",8,1 <return>
NEW <return>
SYS 49152 <return>
```

A SIZZLE ON message would appear, and any subsequent Load operation, except a directory ($), would use the Sizzle FastDOS at 49152.

The third option creates fast-loader boot files for your application programs. Sizzle reads the directory of your applications disk into memory and displays it in a window. Then you move the pointer to the program you want to fast-load, press return and, at the prompt, enter a name for the boot file.

You also must specify whether you want the application program to run automatically after it's loaded; whether you want Sizzle disabled after a single program file has been loaded; and where in memory you want Sizzle to reside. If you like, you can place Sizzle beneath Basic ROM or in screen memory, where you can watch the loading process.

To load a 1231-byte Sizzle boot file, enter its filename, followed by the usual ,8,1. It will load through the tape buffer and on up through screen memory, filling the display screen with unintelligible characters in the process.

The first two bytes of the boot file will be written over the CHROUT vector at address $0324, so after the file has loaded and the computer has printed READY, the Load routine will be redirected to a machine language program in the tape buffer. The FastDOS will then be either copied from the screen to the appropriate location for execution or will be executed in place, and the application program will be fast-loaded into the computer.

The fourth main menu option is to exit Sizzle.

Program Notes

Here are some things to keep in mind when you're using Sizzle:

1. Run-stop/restore disables Sizzle by resetting the load vector to the normal address.

2. You can toggle Sizzle on and off by issuing a SYS command to the starting address. For example, if Sizzle were located at $C000, SYS 49152 would turn it off or on. As you toggle, SIZZLE OFF and SIZZLE ON appear on the screen.

3. When you load a disk directory ($) with Sizzle activated, execution reverts to the normal load routines—except when Sizzle is located under Basic ROM ($A000). In that case, the system crashes. To circumvent this problem, view the directory with DOS 5.1 or with a similar wedge program.

4. If Sizzle is located under Basic ROM, it can't be toggled on and off, but you can permanently disable it with run-stop/restore.

5. If the program you want to fast-load doesn't clear the screen or print to the screen while it's loading, it will load flawlessly if you prepare the Sizzle boot to execute in screen memory. You should never pick the screen as the location for Sizzle if your application program does anything

Table 1. Loading time comparisons.

Program Size	Normal Load	Sizzle Load (Factor)	Sizzle Boot Load (Factor)
27 blocks	18 sec.	5 sec. (3.6)	9 sec. (2.0)
54 blocks	35 sec.	8 sec. (4.0)	12 sec. (2.9)
90 blocks	59 sec.	12 sec. (4.9)	16 sec. (3.7)
113 blocks	72 sec.	14 sec. (5.1)	18 sec. (4.0)
194 blocks (5 files)	127 sec.		33 sec. (3.8)

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to the screen while it's loading.

6. One of your options when preparing a Sizzle boot is to disable Sizzle after loading a single program file. If you execute a Sizzle boot in screen memory without doing this, the load vector will remain pointed at screen memory after the load has been completed. Then, if you try to load another program without first pressing run-stop/restore, you may expect a major crash.

7. The disable option can be useful for word processors that tend to use every corner of memory and thus may overwrite the fast-loader. Many word processors also save text in program files and use the load routines to get the text into memory. With the fast-loader disabled, a word processor can load text normally.

8. If you load Sizzle into the top of Basic RAM, you'll first need to lower the top of Basic by poking the starting address of Sizzle into locations 55 (lo) and 56 (hi). Otherwise, Sizzle will be overwritten by Basic variables. If you select the top of Basic RAM for a Sizzle boot, the top of Basic is automatically lowered by the boot program before Sizzle is copied there.

9. Many commercial copy-protected programs don't use the normal load vector when loading multiple program files. In such cases, Sizzle loads only the first file in the series faster than normal. If the program does use the normal load vector, all the files are fast-loaded.

10. Sizzle works with the 1571 disk drive, as well as the 1541. However, programs that have been saved on a 1571 load more slowly than do those saved on a 1541. The reason is that the 1571 saves successive blocks of the file six blocks apart around the track (interleave = 6), whereas the 1541 separates them by ten blocks (interleave = 10). Sizzle isn't fast enough to pick up successive blocks if they're only six blocks apart, so it has to pick up the next block on the next revolution. You can change the interleave of the 1571 to 10 before saving a C-64 program by sending "U0>S" + CHR$(10) over the command channel.

11. One of the first things you should do is make a fast-boot for the Sizzle program. It will then load in about ten seconds. Ⓡ

Ray Roberts is the founder of KnowledgeWare, a science-database company in Gainesville, Florida.

Philip Bacon is a mathematics professor at the University of Florida.

Listing 1. Sizzle program.

```
10 GOSUB2540:DIM PN$(144),A(935
   ),B(285)              :REM*36
20 PRINT"{CTRL 1}":POKE5328Ø,3:
   POKE53281,3:OPEN15,8,15
                         :REM*1Ø
30 PRINT"{SHFT CLR}{8 CRSR DNs}
   {5 CRSR RTs}PLEASE WAIT."
                         :REM*234
40 PRINT"{CRSR DN}{5 CRSR RTs}R
   EADING DATA STATEMENTS...{2
   CRSR DNs}":GOSUB262Ø:REM*114
50 PRINT"{SHFT CLR}***********
   * SIZZLE MAKER ***********
   ";                    :REM*24Ø
60 PRINT"*"SPC(5)"BY RAY ROBERT
   S & PHIL BACON"SPC(6)"*";
                         :REM*48
70 PRINT"*"SPC(5)"RUN MAGAZINE,
    DECEMBER 1987"SPC(6)"*";
                         :REM*1Ø8
80 PRINT"**********************
   *****************" :REM*234
90 PRINTSPC(14)"{CRSR DN}{CTRL
   9} MAIN MENU {CTRL Ø}"
                         :REM*134
100 GOSUB259Ø:PRINTSPC(7)"{2 CR
    SR DNs}1. INSTALL SIZZLE IN
     MEMORY"             :REM*25Ø
110 PRINTSPC(7)"{CRSR DN}2. CRE
    ATE SIZZLE BINARY FILE"
                         :REM*64
120 PRINTSPC(7)"{CRSR DN}3. CRE
    ATE SIZZLE BOOT PROGRAM
                         :REM*224
130 PRINTSPC(7)"{CRSR DN}4. EXI
    T TO BASIC           :REM*2Ø6
140 PRINTSPC(7)"{2 CRSR DNs}PRE
    SS NUMBER OF CHOICE ";
                         :REM*7Ø
150 GOSUB252Ø:IFKEY$="{FUNCT 1}
    "THEN5Ø              :REM*2Ø6
160 CV=VAL(KEY$):IFCV<1ORCV>4TH
    EN15Ø                :REM*164
170 ONCVGOTO19Ø,43Ø,68Ø:REM*224
180 CLOSE15:END          :REM*124
190 PRINT"{SHFT CLR}{2 CRSR DNs
    }{6 CRSR RTs}WHERE IN MEMOR
    Y WOULD YOU          :REM*5Ø
200 PRINT"{CRSR DN}{6 CRSR RTs}
    PUT SIZZLE?"         :REM*58
210 PRINTSPC(8)"{3 CRSR DNs}1.
    UNDER BASIC ROM ($AØØØ)
                         :REM*154
220 PRINTSPC(8)"{CRSR DN}2. TOP
     OF BASIC RAM"       :REM*134
230 PRINTSPC(8)"{CRSR DN}3. $CØ
    ØØ                   :REM*2Ø4
240 PRINTSPC(8)"{CRSR DN}4. YOU
     ENTER LOCATION":GOSUB147Ø
                         :REM*6
250 PRINT"{HOME}{15 CRSR DNs}"S
    PC(8)"{2 CRSR DNs}PRESS NUM
    BER OF CHOICE ";     :REM*44
260 GOSUB252Ø:IFKEY$="{FUNCT 1}
    "THEN5Ø              :REM*61
270 CV=VAL(KEY$):IFCV<1ORCV>4TH
    EN26Ø                :REM*21
280 ONCVGOSUB2ØØØ,2Ø1Ø,2Ø2Ø,2Ø4
    Ø                    :REM*141
290 PRINT:PRINT"{SHFT CLR}{1Ø C
    RSR DNs}STANDBY... POKING S
    IZZLE INTO MEMORY.":A(81)=1
                         :REM*123
300 W=1:X=RI:Y=9Ø9:GOSUB41Ø
                         :REM*51
310 IFCV=1THENPOKE816,237:POKE8
    17,7:W=921:X=2Ø24:Y=935:GOS
    UB41Ø:GOTO33Ø        :REM*219
320 X=RI+84:GOSUB251Ø:POKE816,X
    L:POKE817,XH         :REM*71
330 PRINT"{SHFT CLR}{2 CRSR DNs
    }"SPC(1Ø)"SIZZLE INSTALLED.
    "                    :REM*193
340 PRINT"{4 CRSR DNs}RUN-STOP/
    RESTORE WILL DISABLE SIZZLE
    .                    :REM*69
350 IFCV=1THEN38Ø        :REM*231
360 PRINT"{CRSR DN}SYS"RI"TO TO
    GGLE SIZZLE ON AND OFF."
                         :REM*95
370 IFCV=2THENPOKE55,B(52):POKE
    56,B(56):CLOSE15:END :REM*9
380 GOSUB147Ø            :REM*115
390 GETCH$:IFCH$="{FUNCT 1}"THE
    N5Ø                  :REM*65
400 GOTO39Ø              :REM*235
410 FORI=WTOY            :REM*215
420 POKEX,A(I):X=X+1:NEXT:RETUR
    N                    :REM*1Ø5
430 PRINT"{SHFT CLR}{3 CRSR DNs
    }{3 CRSR RTs}WHICH STARTING
     ADDRESS DO YOU WANT"
                         :REM*153
440 PRINT"{CRSR DN}{3 CRSR RTs}
    THE SIZZLE BINARY FILE TO L
    OAD AT?              :REM*11
450 PRINTSPC(8)"{3 CRSR DNs}1.
    TOP OF BASIC RAM     :REM*85
460 PRINTSPC(8)"{CRSR DN}2. $CØ
    ØØ                   :REM*177
470 PRINTSPC(8)"{CRSR DN}3. YOU ►
```

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```
    ENTER LOCATION      :REM*93
48Ø GOSUB147Ø:PRINT"{HOME}{16 C
    RSR DNs}"SPC(8)"PRESS NUMBE
    R OF CHOICE ";      :REM*177
49Ø GOSUB252Ø:IFKEY$="{FUNCT 1}
    "THEN5Ø             :REM*35
5ØØ CV=VAL(KEY$):IFCV<1ORCV>3TH
    EN49Ø               :REM*193
51Ø ONCVGOSUB2Ø1Ø,2Ø2Ø,2Ø4Ø
                        :REM*63
52Ø PRINT:PRINT"{SHFT CLR}{1Ø C
    RSR DNs}STANDBY... WRITING
    SIZZLE TO DISK.":PRINT
                        :REM*36
53Ø NM$="SIZZLE."+RIGHT$(STR$(R
    I),LEN(STR$(RI))-1):REM*174
54Ø OPEN2,8,2,NM$+",P,W":GOSUB2
    6ØØ:PRINT:X=RI:GOSUB251Ø:A(
    81)=Ø               :REM*48
55Ø PRINT#2,CHR$(XL)CHR$(XH);
                        :REM*132
56Ø FORI=1TO893         :REM*186
57Ø PRINT#2,CHR$(A(I));:PRINT"{
    CRSR UP}WRITING BYTE #"I:NE
    XT:CLOSE2           :REM*244
58Ø PRINT"{SHFT CLR}{2 CRSR DNs
    }{3 CRSR RTs}"CHR$(34)NM$CH
    R$(34)" BINARY FILE CREATED
    ."                  :REM*5Ø
59Ø IFCV=1THEN61Ø       :REM*2Ø4
6ØØ CV=Ø:GOTO34Ø        :REM*25Ø
61Ø PRINT"{2 CRSR DNs}"SPC(7)"C
    AUTION!":PRINT"{2 CRSR DNs}
    WHEN LOADED AS A BINARY FIL
    E AT"               :REM*4
62Ø PRINT"{CRSR DN}THE TOP OF B
    ASIC RAM, YOU MUST FIRST"
                        :REM*4
63Ø PRINT"{CRSR DN}LOWER THE TO
    P OF BASIC SO SIZZLE WON'T"
                        :REM*96
64Ø PRINT"{CRSR DN}BE OVERWRITT
    EN BY VARIABLES."   :REM*1Ø2
65Ø PRINT"{2 CRSR DNs}TYPE THE
    FOLLOWING BEFORE LOADING SI
    ZZLE";:X=Q:GOSUB251Ø
                        :REM*152
66Ø PRINT"{CRSR DN}{4 CRSR RTs}
    POKE55,"XL"{CRSR LF}:POKE56
    ,"XH                :REM*222
67Ø PRINT"{CRSR DN}SYS"RI"TOGGL
    ES SIZZLE ON AND OFF.":GOTO
    38Ø                 :REM*2ØØ
68Ø PRINT"{SHFT CLR}{6 CRSR DNs
    }"SPC(8)"ONE MOMENT PLEASE.
    "                   :REM*226
69Ø PRINTSPC(8)"{CRSR DN}READIN
    G DISK DIRECTORY    :REM*188
7ØØ SYS828:PM=PEEK(254):GOSUB26
    ØØ                  :REM*36
71Ø PRINT"{SHFT CLR}":GOSUB147Ø
    :GOSUB15ØØ:PRINT"{HOME}{5 C
    RSR DNs}"TAB(23)"USE UP/DOW
    N"                  :REM*18Ø
72Ø PRINTTAB(23)"CURSOR KEYS TO
    "                   :REM*25Ø
73Ø PRINTTAB(23)"MOVE POINTER."
                        :REM*254
74Ø PRINTTAB(23)"{3 CRSR DNs}PR
    ESS <RET> TO"       :REM*118
75Ø PRINTTAB(23)"MAKE SELECTION
    ."                  :REM*42
76Ø PRINTTAB(23)"{3 CRSR DNs}PR
    ESS "CHR$(34)"S"CHR$(34)" T
    O"                  :REM*174
77Ø PRINTTAB(23)"SCRATCH A FILE
    ."                  :REM*93
78Ø PRINT"{HOME}{2 SPACEs}DISKN
    AME: "PN$(Ø)"{CRSR DN}":PL=
    1:PH=2Ø:GOSUB79Ø:GOTO84Ø
                        :REM*41
79Ø FORI=1TOPM          :REM*91
8ØØ PN$(I)=PN$(I)+LEFT$(X$,16-L
    EN(PN$(I))):NEXT    :REM*85
81Ø FORI=PLTOPH         :REM*249
82Ø PRINTTAB(4)PN$(I)   :REM*69
83Ø NEXT:RETURN         :REM*5
84Ø LN=1:PN=1:GOSUB142Ø:REM*151
85Ø GETKEY$:IFKEY$=""THEN85Ø
                        :REM*127
86Ø IFKEY$="{CRSR UP}"THENGOSUB
    92Ø:GOTO85Ø         :REM*87
87Ø IFKEY$="{CRSR DN}"THENGOSUB
    95Ø:GOTO85Ø         :REM*33
88Ø IFKEY$="{FUNCT 1}"THEN5Ø
                        :REM*45
89Ø IFKEY$="S"THENGOSUB99Ø:PRIN
    T#15,"SØ:"NM$:GOSUB259Ø:GOT
    O68Ø                :REM*145
9ØØ IFKEY$=CHR$(13)THEN98Ø
                        :REM*137
91Ø GOTO85Ø             :REM*211
92Ø IFPN=1THENRETURN    :REM*51
93Ø PN=PN-1:IFLN=1THENPL=PL-1:P
    H=PH-1:PRINT"{HOME}{CRSR DN
    }":GOSUB81Ø:GOSUB142Ø:RETUR
    N                   :REM*9
94Ø LN=LN-1:GOSUB142Ø:RETURN
                        :REM*27
95Ø IFPN=PMTHENRETURN   :REM*35
96Ø PN=PN+1:IFLN=2ØTHENPL=PL+1:
    PH=PH+1:PRINT"{HOME}{CRSR D
    N}":GOSUB81Ø:GOSUB142Ø:RETU
    RN                  :REM*217
97Ø LN=LN+1:GOSUB142Ø:RETURN
                        :REM*185
98Ø GOSUB99Ø:GOTO1Ø2Ø   :REM*159
99Ø NM$=PN$(PN)         :REM*19
1ØØØ IFRIGHT$(NM$,1)=CHR$(32)TH
    ENNM$=LEFT$(NM$,LEN(NM$)-1
    ):GOTO1ØØØ          :REM*1Ø9
1Ø1Ø RETURN             :REM*47
1Ø2Ø BN$=LEFT$(NM$,13):BN$=BN$+
    ".SB":N2$=NM$       :REM*2Ø5
1Ø3Ø PRINT"{SHFT CLR}":GOSUB147
    Ø:PRINT"{HOME}{3 CRSR DNs}
    THE DEFAULT PROCEDURE LEAV
    ES THE NAME OF";    :REM*88
1Ø4Ø PRINT"THE ORIGINAL PROGRAM
     UNCHANGED AND ADDS"
                        :REM*56
1Ø5Ø PRINT"THE SUFFIX "CHR$(34)
    ".SB"CHR$(34) "TO THE SIZZ
    LE-BOOT"            :REM*74
1Ø6Ø PRINT"PROGRAM."     :REM*6
1Ø7Ø PRINT"{2 CRSR DNs}{CTRL 9}
     PROGRAM NAME:{CTRL Ø} "N2
    $                   :REM*18
1Ø8Ø PRINT"{CRSR DN}{CTRL 9}SIZ
    ZLE-BOOT NAME:{CTRL Ø} "BN
    $                   :REM*2Ø6
1Ø9Ø PRINT"{2 CRSR DNs} ARE THE
    SE NAMES ACCEPTABLE (Y/N)?
     ";                 :REM*56
11ØØ GOSUB252Ø          :REM*19Ø
1111Ø IFKEY$="Y"THEN134Ø  :REM*Ø
112Ø IFKEY$="N"THEN115Ø:REM*244
113Ø IFKEY$="{FUNCT 1}"THEN5Ø
                        :REM*4Ø
114Ø GOTO11ØØ           :REM*78
115Ø PRINT"{SHFT CLR}":GOSUB147
    Ø:PRINT"{HOME}{5 CRSR DNs}
    {CTRL 9}CURRENT NAME OF PR
    OGRAM:{CTRL Ø} "NM$ :REM*8
116Ø PRINT"{2 CRSR DNs}DO YOU W
    ANT TO CHANGE THE NAME (Y/
    N)? ";              :REM*128
117Ø GOSUB252Ø          :REM*4
118Ø IFKEY$="Y"THEN122Ø:REM*164
119Ø IFKEY$="N"THENGOSUB149Ø:GO
    TO126Ø              :REM*14Ø
12ØØ IFKEY$="{FUNCT 1}"THEN5Ø
                        :REM*11Ø
121Ø GOTO117Ø           :REM*116
122Ø GOSUB149Ø:PRINT"{HOME}{8 C
    RSR DNs}{38 SPACEs}"
                        :REM*2Ø4
123Ø INPUT"{CRSR UP}NEW PROGRAM
     NAME";N2$          :REM*72
124Ø IFLEN(N2$)>16THENPRINT"{CR
    SR DN}NAME TOO LONG. TRY A
    GAIN!":GOTO122Ø     :REM*28
125Ø GOTO127Ø           :REM*172
126Ø PRINT"{8 CRSR DNs}{37 SPAC
    Es}"                :REM*234
127Ø PRINT:INPUT"SIZZLE-BOOT PR
    OGRAM NAME";BN$     :REM*16Ø
128Ø IFLEN(BN$)>16THENPRINT"{CR
    SR DN}NAME TOO LONG. TRY A
    GAIN!":GOTO127Ø     :REM*13
129Ø IFBN$<>N2$THEN134Ø:REM*155
13ØØ PRINT"{SHFT CLR}":GOSUB147
    Ø:PRINT"{HOME}{2 CRSR DNs}
    NAMES CAN NOT BE IDENTICAL
    !"                  :REM*225
131Ø GETKEY$:IFKEY$=""THEN131Ø
                        :REM*67
132Ø IFKEY$="{FUNCT 1}"THEN5Ø
                        :REM*231
133Ø GOTO131Ø           :REM*77
134Ø GOSUB154Ø          :REM*231
135Ø PRINT"{SHFT CLR}":GOSUB147
    Ø:PRINT"{HOME}{8 CRSR DNs}
     DO YOU WANT THE PROGRAM T
    O AUTORUN"          :REM*63
136Ø PRINT"{CRSR DN}AFTER LOADI
    NG (Y/N)? ";        :REM*133
137Ø GOSUB252Ø          :REM*2Ø5
138Ø IFKEY$="Y"THENB(194)=1:GOT
    O162Ø               :REM*43
139Ø IFKEY$="N"THENB(194)=Ø:GOT
    O162Ø               :REM*23
14ØØ IFKEY$="{FUNCT 1}"THEN5Ø
                        :REM*55
141Ø GOTO137Ø           :REM*93
142Ø PRINT"{2 CRSR LFs}{2 SPACE
    s}{HOME}"           :REM*7
```

Continued on p. 114.

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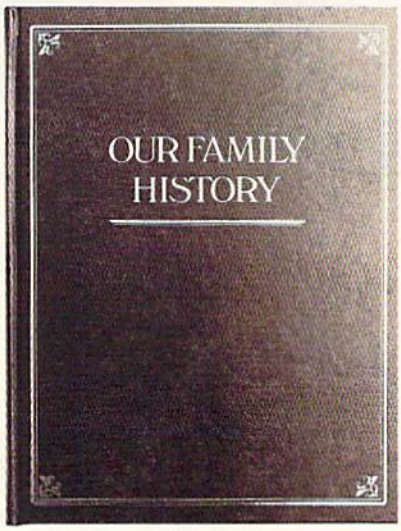
All in the Family Tree

Genealogy is a blast from the past, as you can discover with the help of your Commodore.



PERHAPS YOUR ancestors came over on the Mayflower, or perhaps they were brought in a slave ship. Perhaps you're a Native American whose forebears have been here for thousands of years, or maybe your grandparents arrived at Ellis Island around the turn of this century. Whatever your heritage, you might be one of the growing number of Americans who value their roots and want to learn more about them—folks who find genealogy an exciting and fulfilling hobby.

If you are on the trail of your ancestors, your Commodore can help. Take Paul Andereck, for instance. He's editor of *Genealogical Computing*, a quarterly newsletter published in Salt Lake City, Utah, and has spent the past thirty years tracing his father's line all the way back to 1488 in Switzerland.

According to Andereck, the ultimate advantage of computerizing genealogical information is in clarifying family relationships for your descendants. "The index is in your head," he says. "When you die, people will save your old photographs and letters, but everything else will be just cryptic junk they'll throw away. They won't understand that Sally Jones was the first wife of your older brother." They will understand, however, if you've computerized your family history and printed out a family tree.

Genealogy programs are available today for everyone, from novices to experienced searchers. Some of the programs are comprehensive and detailed; others are simpler and less costly. Some buffs even devise their own systems, based on generic database programs.

In this article, we'll survey some noteworthy commercial genealogy programs available today for the C-64 and C-128. In the sidebar, we'll also mention some bulletin boards and online networks that offer assistance to computerists tracing their roots.

Keep one caveat in mind as you contemplate using your computer to help uncover your her- ►

By CHRISTINE AND JOHN ADAMEC

PHOTOGRAPHED BY LARRY DUNN

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itage: Don't expect it to do everything. A genealogical search is not a matter of running a few disks, and boom, you've traced your lineage back ten generations. You must visit elderly relatives to record what they know, pore through papers in town halls and churches to check birth, baptismal and death records and wander around cemeteries reading tombstones. Numerous books and other publications are available to show you how to do this legwork.

Table 1 lists manufacturers and prices for the software we've reviewed, as well as other genealogy programs we're aware of and books and periodicals that will help you amass your family data.

Family Roots

One of the best-known genealogy programs available today is Family Roots, by Quinsept, Inc. This comprehensive and powerful C-64 program prints out family trees, alphabetized lists and much more, based on data you've typed in regarding your lineage. It also lets you do linkage searches to uncover connections between people from centuries ago. Because of the size of the program, entering the data takes quite a while.

For the moment, anyway, you can be a genealogy novice, but not a computer novice, and use Family Roots. It requires making minor software "patches," which presumes some general computer knowledge. According to Quinsept, future versions of the program will come with these patches.

The manual recommends copying the two unprotected Family Roots disks before you do anything else. The program's Diskcopy option is slow, so we recommend using your own copying program, along with a fast-load cartridge. However, be careful: The Family Roots manual says some fast-load cartridges will lock up the program, so make sure yours is compatible with the software before using it.

Formatting disks to receive data is no simple task with Family Roots, or any of the other programs we reviewed. For instance, in addition to the normal formatting in Family Roots, the program sends actual file information to the disk—sort of like chapter headings for the data you'll enter later. We stopped timing a format after twenty minutes, as the disk drive charged full speed ahead, creating over 500 separate files—

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Experts agree that if you are interested in computerized genealogy, it's a good idea to join a user's group.

this with the help of our Epyx Fast Load cartridge. We think manufacturers should provide at least one formatted disk to start with, along with instructions on how to create additional disks.

Our version of Family Roots crashed quite a few times. Each time it did, we received an error message, but what to do about correcting the error wasn't immediately evident. For example, when we got an Error in Checksum message, we ended up having to rerun the program. That particular error never cropped up again.

Once you're ready to enter data into Family Roots, just answer the questions on the screen. You'll input each family member's name, birth date, marriage date, whether living or deceased, children's names and birth dates, as well as other information. Each person you enter is automatically given a number, to help the program in tracking.

Family Roots offers a variety of printout and list options. For example, you can track family movements during a specific time period, print an alphabetized list of everyone in your family tree and produce a chart of your ancestors and their descendants. The program also includes a simple word processor with which you can type a page or two of notes on the more intriguing family members. Perhaps you'd like to create a "black sheep" file!

You can also record a woman's maiden and married names, a feature lacking in the other programs we reviewed, and another asset of this program is that it automatically complements entries. Say you're typing up a file on Uncle Henry and you realize you should add Grandpa's data. Just enter Grandpa's record number and, presto, he's in!

Family Roots' primary advantage, thoroughness, is also its primary drawback. The program is written for the Macintosh, IBM PC and other computers, as well as for the C-64, and everyone receives the same type of database setup and options. However, many users of these other systems have memory expansion and hard drive storage, and what's easy and fast for them to manipulate may be very cumbersome on a C-64 with one disk drive.

Of all the programs we reviewed, Family Roots comes with the most detailed manual; obviously, considerable care went into its writing.

Once you buy Family Roots, you're eligible to join the Quinsept User Group, which provides ►

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a newsletter and support information to help you make the best use of the program.

ARBOR-AIDE

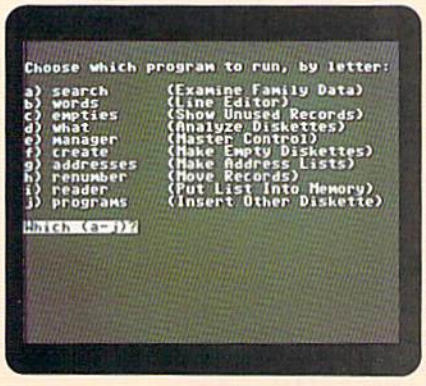
Our second favorite of the programs we reviewed is Arbor-Aide, for the C-64, from Software Solutions. We found this program comprehensive and easy to use, although it's not as multifaceted and powerful as Family Roots. Of course, its price is correspondingly lower.

As in Family Roots, one Arbor-Aide file is dedicated to each individual and his or her relationships to other people. Numerical coding makes this possible. Arbor-Aide can generate linkages and charts for the serious genealogist, and the data and chart software is integrated, so you don't have to type in data twice.

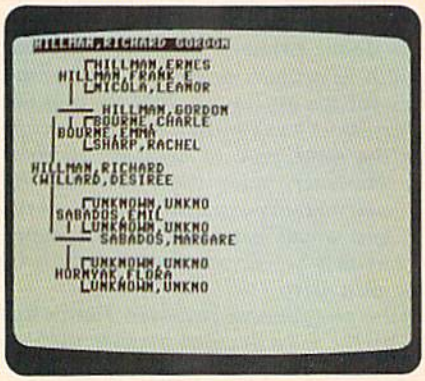
Arbor-Aide offers church affiliation and additional categories that the other programs we tried do not. It also uses codes for churches and city locations, which saves considerably on disk space.

Disk formatting and initialization takes about 15 minutes with an Epyx Fast Load cartridge. The printer setup is comprehensive, and the manual even includes control codes for condensed, expanded and other print modes.

Although we liked Arbor-Aide, we did encounter a serious problem with it. The manufacturer told us not to change our last name in any way, at risk of disabling the disk. We didn't type our name differently on purpose, but we may have done it by accident, because both disks crashed irretrievably. We can envision careful users proudly showing the results of their genealogical research to cousin Fred, who unknowingly types in a name wrong and destroys the files. The program's copy protection may contribute to or cause this problem, because the protection scheme involves encoding your name on the disk. This is the only program we reviewed that's copy-protected.



A list of some of the many options offered by Family Roots.



A screen shot from Family Tree's Pedigree program.

FAMILY TREE

Another lower-cost genealogy package we tried and liked is Family Tree, for the C-64 and C-128, from Genealogy Software. This program encodes each family member by number and ultimately prints out a family tree. We appreciated its completeness and easy data entry—you don't need to be a "techie" to master this one. A demo program showed us what the software could do, and the manual was clear and logically organized.

Family Tree doesn't offer some of the categories, such as church membership and place of burial, that other programs like Family Roots and Arbor-Aide provide. Members of the Church of Latter Day Saints (Mormons), for whom researching genealogy is a religious function, will be pleased to note, however, that a special version of the program for them offers such extra fields as baptism, endowment, sealed to parents and sealed to spouse.

With Family Tree, you can store up to 575 files on a 1541 data disk and 1200 files on a 1571 data disk. You can also do a search of individuals by their name or number and produce a printout of everyone with the same name. At your request, the company will provide a copy program that will back up your disks in seven minutes. (We didn't try this option.)

Family Tree comes with a bibliography of genealogical books to help you get going. They range from general genealogy to genealogy in specific nations, including the U.S., Canada, England and others.

Unfortunately, Family Tree's data and chart programs aren't integrated, so you have to enter data twice. However, the reasonable price and ease of use of this program make it an attractive option for prospective and practicing genealogists.

BYTEWARE SOFTWARE FOR THE GENEALOGIST

ByteWare's genealogical software, for the Commodore 64 and C-128, actually includes three programs: Family Group Sheet, Pedigree Chart and Miniature Utility. In addition to the usual functions of genealogy software, these programs offer several options that are not in-

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cluded in the other packages we checked out.

For instance, with Miniature Utility you can generate form letters for verifying data, maintain a mailing list and print out mailing labels. Miniature Utility also lets you estimate dates from other dates, such as a birth date from a marriage or death date, as well as performing various disk maintenance tasks.

Family Group Sheet prints out an information sheet on your family, including each person's name, birth date, baptismal date, occupation, mother and father and other data. Pedigree Chart prints out a family tree that shows data for the people listed in the printout and linkages between them.

These programs are easy to use, with on-screen instructions that tell which function keys to press for various tasks. They're also the fastest in disk formatting of the programs we reviewed, completing the process in under two minutes.

We do have a few criticisms, however. Files are stored sequentially, and, unlike Family Roots or Family Tree, individual people aren't given identification numbers. Also, Family Group Sheet and Pedigree Chart have separate files, so a lot of information has to be entered twice.

VITASTAT

VitaStat, written for the C-64 by genealogist and programmer Don Marsh, is a database-type program that organizes family data in a logical format and does keyword searches of names. This ►

Online Genealogy Services

By CHRISTINE ADAMEC and ALBERT OLTHAUS

IF YOU'D LIKE TO USE your computer and modem to communicate electronically with others who share your fascination with genealogy, there are a variety of exciting options available. You can access genealogical services on QuantumLink, GEnie, PlayNet and the National Genealogy Conference Network, and CompuServe is planning a genealogy forum that may be online by the time you read this.

Q-Link's genealogy section, Your Family Tree, covers subjects such as indexing, county histories and genealogical books, and it periodically holds conferences where you can talk with the experts. You can also leave family queries in the Root Cellar and seek research tools in the Research Helper and Family Treehouse Library.

GEnie offers the Genealogy Round Table, with a software library as well as ethnic and regional groups, including Jewish, French-Canadian, German-Texan, Italian and so on.

PlayNet provides genealogical information in their Family Heritage section. Sysops of Family Heritage appear on a rotating basis, so you have a chance to communicate with more than one expert.

The National Genealogy Conference Network is manned at no charge by CommSoft, a Mountain View, California, software company. Their programs run only on the IBM and compatibles, so Commodore users can't download programs, but the Network is still very useful for communicating with other genealogical enthusiasts.

This system was started about a year ago and is growing rapidly. About 35 NGCN bulletin boards now dot the United States from Hawaii to New Hampshire and extend into Canada, and boards are planned for Europe and Australia. Call their voice phone at 800-32-ROOTS to find the board closest to you.

According to Howard Nurse, NGCN coordinator and president of CommSoft, a message sent to a local board will appear on every other board within a few days, giving you wide networking capabilities. Nurse also reports that "by far, most of the questions directly concern genealogy and the search for specific families." He continues, "I was able to extend one of my wife's family lines back five more generations!"

Online services may not immediately yield such dramatic results for you. However, they will provide you with an opportunity to communicate with others who are interested in genealogy and can offer helpful hints and guidelines. R

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is the most menu-driven of all the programs we reviewed, and it's very easy to use. For the times when you do need the manual, the text is short and clearly written.

VitaStat can't generate a family tree, so if this feature is important to you, you'll need Marsh's family tree program called Family + Closet (which we didn't test). While VitaStat isn't as powerful as the other programs we tried, it is reasonably priced and a good value for the money.

Table 1. Manufacturers and prices.

Software reviewed here:

Family Roots
C-64, C-128
Quinsept, Inc.
PO Box 216
Lexington, MA 02173
$185

Arbor-Aide
C-64
Software Solutions
7378 Zurawski Court
Custer, WI 54423
Demo disk, $5; Arbor-Aide/80 (all printers), $49.95;
Traditional Arbor-Aide (Epson printers), $59.95;
Sources/Notes module, $10

Family Tree
C-64, C-128
Genealogy Software
PO Box 1151
Port Huron, MI 48061
$51.95

Software for the Genealogist: Family Group Sheet, Pedigree Chart and Miniature Utility
C-64, C-128
ByteWare
906 West 6th Ave.
Monmouth, IL 61462
Family Group Sheet and Pedigree Chart, $21.95 each; Miniature Utility, $13.95; all three for $36.95

VitaStat
C-64
Don A. Marsh
801 East Sumpter
Mexia, TX 76667
$19.95

Other software:

Your Family Tree
C-64
Hurdware, Inc.
PO Box 241746
Memphis, TN 38124

Family
C-64
Petrocci Freelance Associates
651 N. Houghton Rd.
Tucson, AZ 85748
$34.95

Your Ancestors
C-64
Ken Barber
5785 Brickyard Rd.
Tillamook, OR 97141
$10

Periodicals:

Genealogical Computing
Ancestry Publishing
PO Box 476
Salt Lake City, UT 84110
Quarterly, $12.95 each, $25 per year

Genealogy Computer Pioneer
Posey International
PO Box 338
Orem, UT 84057
Bimonthly, $25 per year

Books:

Computer Genealogy: A Guide to Research Through High Technology
By Paul Andereck and Dick Pence
Ancestry Publishing
PO Box 476
Salt Lake City, UT 84110
$12.95

Turbo Genealogy
By Carolyn and John Cosgriff
Progenesys Press
PO Box 2623
Christiansburg, VA 24068
$17.95

Readers may send a self-addressed, stamped envelope to Carolyn Cosgriff, c/o Progenesys, and she'll provide a short instructional brochure on genealogy at no charge.

Don Marsh has also written a program called FedCen that arranges databases like former U.S. Census reports. According to Marsh, the first Census, in 1790, was primarily interested in the number of men over age 16 in each household, but each Census after that added more information. If you've tracked your family back to the 1800s or earlier, you'll be interested in these formats.

Create Your Own System

Some genealogists create their own data system, using software they already have. For instance, Richard Atwood, owner of a C-64 and coordinator for the Computer User Interest Group of the Genealogical Society of South Brevard in Florida, uses both Practicorp's PractiCalc 2 and Electronic Arts' The Consultant for managing family data. "PractiCalc is a spreadsheet with sorting capabilities that I use to enumerate the individuals I have," he explains. "I use The Consultant, a database management system, to provide more backup information."

Atwood created a simple numerical scheme, with himself as number one, his father as number two, his mother as number three, and so on. He's used his system to record his direct lineage back fourteen generations.

User's Groups

Whether you purchase one of the genealogy programs in this article or create your own system, experts agree that if you're interested in computerized genealogy, it's a good idea to join a user's group. "I think it's best to join a user group that has genealogy members as well as computer members," says Paul Andereck. "In that way, you can find someone who doesn't mind if you ask a genealogy question over the phone on a Saturday morning or who will come over to show you how your printer works with your computer." Andereck's publication, *Genealogical Computing*, provides listings of user's groups and online groups, software information and much more.

So, these are a few key genealogy programs available today for the C-64 and C-128. We consider Family Roots the most powerful and all-around best, but its price tag of $185 might scare off amateur genealogists. The other programs we reviewed are lower in price and correspondingly less comprehensive. Whichever you choose, and whether you're a descendant of Attila the Hun or lesser-known persons, you'll find that tracking your ancestry with the help of your computer can be a fulfilling and intriguing pastime. ■

Christine Adamec is an avid computerist and professional writer who has recently completed a book entitled There *Are* Babies To Adopt. *John Adamec, an electrical engineer and longtime computer user, is a program manager for Harris Corporation. Albert Olthaus, a veteran genealogist, is the editor of QuantumLink's* Your Family Tree *newsletter and president of the Seven Hills Genealogy Society.*

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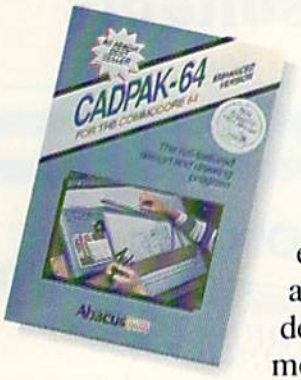

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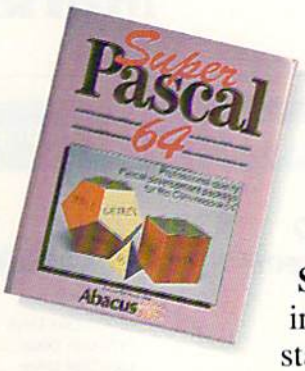

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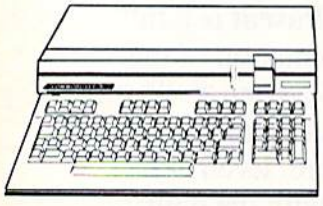

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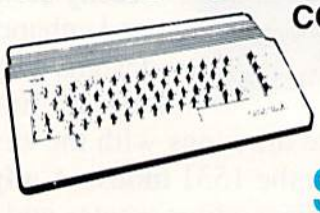

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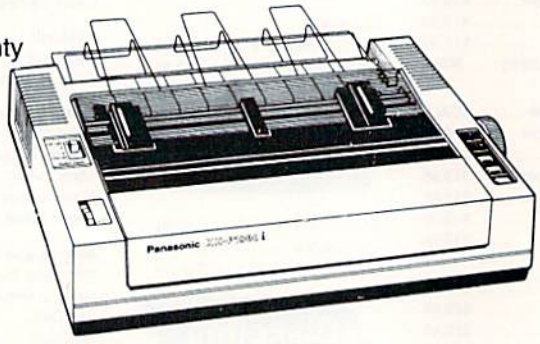

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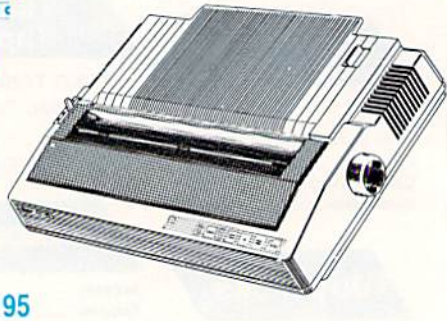

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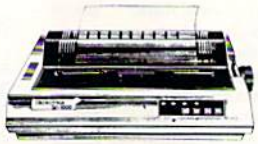

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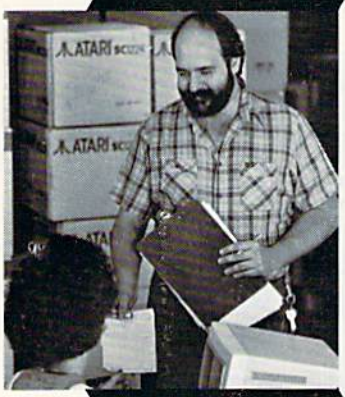

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RUN Investor

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By STAN KRAWCZYK

I wrote RUN Investor, a C-128, 80-Column mode program, to keep track of my stocks on a daily basis. It tells me how much each of my stocks is worth at its current price and whether I'm making or losing money on it. For instance, say I buy XYZ Co. stock for $10 a share in June, $11 a share in July and $9.50 a share in September. RUN Investor will tell me the value of each transaction if the stock is currently selling for $10.50 a share, as well as the total market value at that price.

RUN Investor supports one or two disk drives (devices 8 and 9) and the Commodore 1525/MPS-803 or 1526-compatible printer. It's menu-driven and easy to operate, and it uses the C-128's window capabilities.

Screen display from RUN Investor program.

I've written the program in logical sections, so you'll find it easy to locate the code for different functions. For example, the List File option, which is activated by pressing F3, is located in lines 300–400 and 1300–1400 and the Update Stock Price option, F7, is located in lines 700–800.

Note that the function keys, F1–F8, are redefined in lines 5 and 6 to their C-64 values. The number of disk drives is determined automatically in line 7. If the inquiry to device 9 results in a status of 0, the program sets itself up for two-drive operation. Otherwise, it uses just one.

As written, RUN Investor accommodates up to 100 stock names. However, you can increase this number as your needs grow by changing the DIM values in line 4.

Creating a Stock File

Type in Listing 1, using 128 Perfect Typist, and save it to disk. When you run it, key in the date and initialize a stock file by pressing the F5 key. Then enter, in turn, the name of the company whose stock you want to buy or already own, the number of shares involved (stored in variable SO(I)) and the cost per share. The number of shares can be fractional, down to a ten-thousandth of a share—for instance, 7.1275 shares. When entering the cost per share, use multiples of .125 to represent eighths of a share. You can write your data to disk (device 8 or 9, or both) as soon as you've finished entering it, or you can wait until later. Press F8 to execute the save.

To see the total market value of your stock, press F3. You can print out a report from this option, too.

To create another file, perhaps for another member of your family or to follow some stocks you may want to buy later, press F5 again. Just remember to save it to another disk and to label it accordingly. The program writes the filename Stock File to disk, so make sure your label indicates which stock file. Any previous stock file on a disk will be overwritten when a second save is done.

To quit the program, press the F6 key. If you haven't saved your file, the program will remind you, so the file won't be lost.

The upper-left portion of the RUN Investor screen displays the program and error status. This is done with a POKE 235,0 and PRINT"", which eliminates any character flash on the screen and places the next print on line 1 of the screen.

Updating Your File

The fun begins when your daily paper is delivered and it's time to see how your investments are doing. With the stock section of the paper in hand, load RUN Investor, then enter the date, press F1 to load your file and F7 to update the prices. Your stocks will be listed one at a time, with a prompt for the current quote. If a particular stock hasn't changed in value, enter N or hit the return key; if it has changed, enter Y and the new price, then verify the amount when prompted. After you've updated all your stocks, you can save the update to disk, or wait until later. Press the F3 key to see your gain or loss on each issue of stock and to print out a hard copy.

Say some time lapses and you buy more stock. All you have to do is load RUN Investor, press the F4 key and follow the prompts.

If you decide to sell some stock, press the F2 key and answer the prompts. The program will total all shares of the stock name you want to sell, ask how many shares you plan to let go (in whole ►

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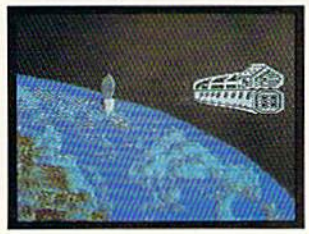

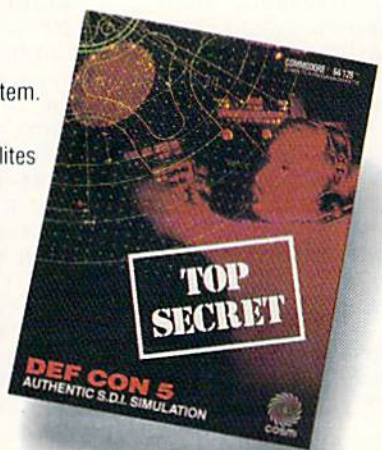

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amounts or fractions down to a ten-thousandth of a share) and then subtract the number you've specified. When all the shares are gone from one issue, it will go to the next issue, as long as the stock name is the same. When an issue is completely gone, all the variables move up one and automatically delete the entry from the file in memory.

If you have a stock file on a second disk, you can load it by pressing F1. The program will remind you if you already have a file in memory. If you want to go ahead and load the new file, change disks and the loading will proceed.

Right now I use RUN Investor's Stock Purchase option (F4) to record dividends reinvested automatically by my broker. When the program asks for a stock, I enter the number of the stock that paid the dividend, then the number of shares bought (the dividend), a purchase price of $0.00 (since it's a dividend) and the price at which the dividend was issued. R

Stan Krawczyk is a computer technician who works for UNISYS. He wrote the RUN Investor program to answer questions arising from his own stock market investments.

Listing 1. The RUN Investor program.

```
10 REM STOCK PORTFOLIO PROGRAM :REM*208
20 REM VER 2.6{2 SPACEs}5/02/87 :REM*216
30 REM BY STAN KRAWCZYK:REM*200
40 FAST:S=0:DIM SN$(100),SO(100),PP(100),CP(100),OP(100),MI(100),TV(100),NP(100) :REM*206
50 P=1:FORI=1TO7STEP2:KEYI,CHR$(132+P):P=P+1:NEXT :REM*88
60 P=1:FORI=2TO8STEP2:KEYI,CHR$(136+P):P=P+1:NEXT :REM*110
70 DD=1:DN=8:OPEN15,9,15:CLOSE15:IFST=0THENDD=2:REM DD=NUMBER OF DRIVES PRESENT :REM*68
80 NS=0:FS=0:FL=0:T3$="#$##.##":T4$="#$###.##-":T6$="#$####.##" :REM*214
90 SCNCLR:COLOR5,6 :REM*28
100 FORI=1TO80:PRINT"=";:NEXT :REM*238
110 PRINT"{CTRL 2}FILE NOT LOADED"TAB(30)"{CTRL 8}STOCK PORTFOLIO{3 SPACEs}2.6" :REM*110
120 COLOR5,6:FORI=1TO80:PRINT"=";:NEXT :REM*8
130 CHAR0,0,21:COLOR5,8:FORI=1TO80:PRINT"{COMD @}";:NEXT :REM*190
140 PRINT"{CTRL 9}F1=LOAD FILE "TAB(17)"F3=LIST STOCKS "TAB(36)"F5=INITIALIZE FILE"TAB(59)"F7=UPDATE STOCK PRICE " :REM*212
150 PRINT"{CTRL 9}F2=SELL STOCK "TAB(17)"F4=BUY STOCK{3 SPACEs}"TAB(36)"F6=QUIT PROGRAM{3 SPACEs}"TAB(59)"F8=SAVE STOCK FILE{3 SPACEs}" :REM*10
160 COLOR5,2 :WINDOW 0,4,79,20:PRINTCHR$(27)+"M" :REM*92
170 INPUT"ENTER DATE{2 SPACEs}(MM/DD/YY) ";DT$:IFDT$=""ORLEN(DT$)>8THENPRINT"{CRSR UP}"CHR$(27)+"Q":GOTO170:ELSE:POKE235,0:PRINT"":PRINTTAB(60);DT$ :REM*116
180 SCNCLR:GOTO350 :REM*142
190 IF FL=1 OR FS=1 THEN POKE 235,0:PRINT"" :REM*52
200 IF FL=1 OR FS=1 THEN PRINT" FILE IN MEMORY ":SCNCLR:CHAR0,0,5:PRINT TAB(5)"FILE ALREADY IN MEMORY , HIT ANY KEY TO CONTINUE":GETKEYA$:SCNCLR:GOTO350 :REM*208
210 IFDD=2THENPRINT"LOAD STOCK FILE FROM DRIVE {CTRL 9}8{CTRL 0} OR {CTRL 9}9{CTRL 0} ";:INPUTDN:IFDN<8 OR DN>9 THEN PRINT"{CRSR UP}"CHR$(27)+"Q";:GOTO190 :REM*102
220 IFDN=8 THEN DOPEN#1,"STOCK FILE",D0,U8 :REM*76
230 IFDN=9 THEN DOPEN#1,"STOCK FILE",D0,U9 :REM*214
240 GOSUB1680:IFDS=0THENPOKE235,0:PRINT"":PRINTCHR$(15)"LOADING{8 SPACEs}" :REM*178
250 IFE<>0THENPOKE235,0:PRINT"":PRINT"FILE NOT LOADED":FL=0:SCNCLR:GOTO350 :REM*198
260 INPUT#1,OD$ :REM*113
270 I=1 :REM*223
280 INPUT#1,SN$(I) :REM*229
290 INPUT#1,SO(I) :REM*111
300 INPUT#1,PP(I) :REM*89
310 INPUT#1,CP(I) :REM*193
320 IFST=0THENI=I+1:GOTO280 :REM*33
330 GOSUB1680 :REM*131
340 IFST=64THENPOKE235,0:CLOSE1:PRINT"":PRINT"FILE LOADED{5 SPACEs}":SCNCLR:S=I:FL=1:GOTO350 :REM*237
350 CHAR 0,0,16:PRINTCHR$(15)TAB(30)"ENTER FUNCTION DESIRED" :REM*131
360 GETKEYR$ :REM*105
370 IFR$=CHR$(133)THENPRINT"{CRSR UP}"CHR$(27)+"Q":SCNCLR:GOTO 190:REM F1-LOAD :REM*143
380 IFR$=CHR$(134)THENGOTO770 : REM F3-LIST FILE :REM*21
390 IFR$=CHR$(135)THENGOTO1180 :REM F5-INITIALIZE FILE :REM*105
400 IFR$=CHR$(136)THENGOTO1400 :REM F7-UPDATE STOCK PRICE :REM*231
410 IFR$=CHR$(137)THENGOTO460 : REM F2-SELL STOCK :REM*227
420 IFR$=CHR$(138)THENGOTO970 : REM F4-BUY STOCK :REM*253
430 IFR$=CHR$(139)THENGOTO1350 :REM F6-QUIT PROGRAM:REM*33
440 IFR$=CHR$(140)THENGOTO1610 : REM F8-SAVE FILE :REM*205
450 GOTO360 :REM*237
460 IF S=0THEN950:ELSE SCNCLR:POKE235,0:PRINT"":PRINT"SELL STOCK{5 SPACEs}" :REM*47
470 TN$="" :REM*205
480 CHAR0,0,2:FORI=1TOS :REM*75
490 IFI>STHEN550 :REM*3
500 IFSN$(I)=SN$(I+1)THENI=I+1:GOTO490:REM DELETE DUPLICATES :REM*249
510 PRINTI;TAB(4);SN$(I);:I=I+1 :REM*251
520 IFI>STHEN550 :REM*34
530 IFSN$(I)=SN$(I+1)THEN I=I+1:GOTO520:REM DELETE DUPLICATES :REM*228
540 PRINTTAB(40);I;SN$(I):NEXT :REM*194
550 PRINT:PRINT"IS STOCK TO BE SOLD ONE OF THE ABOVE....Y/N";:INPUTR$ :REM*92
560 IFR$="Y"THEN INPUT "ENTER STOCK NUMBER";N:IF N>S THEN PRINT" BAD STOCK NUMBER....RE-ENTER":SLEEP2:PRINT"{4 CRSR UPs}"CHR$(27)+"@";:GOTO550 :REM*160
570 IFR$<>"Y"THEN740 :REM*114
580 TN$=SN$(N):TS=SO(N):FORI=NTO1STEP-1 :REM*154
590 IFTN$=SN$(I-1)THENTS=TS+SO(I-1):TS=INT(10000*TS+.5)/100:I=I-1:GOTO590 :REM*20
600 NEXT :REM*100
610 PRINT" YOU HAVE ";TS;" SHARES OF ";TN$ :REM*198
620 INPUT"INPUT NUMBER OF SHARES TO SELL";SS :REM*184
630 SS=INT(10000*SS+.5)/10000 :REM*44
640 IFSS>TS THEN PRINT" YOU CAN'T SELL MORE SHARES THAN YOU HAVE...TRY AGAIN":SLEEP2:SCNCLR:GOTO460 :REM*204
650 PRINT" SELLING ";SS;" SHARES WILL LEAVE ";TS-SS;" SHARES":PRINT"HIT 'C' TO CANCEL ►
```


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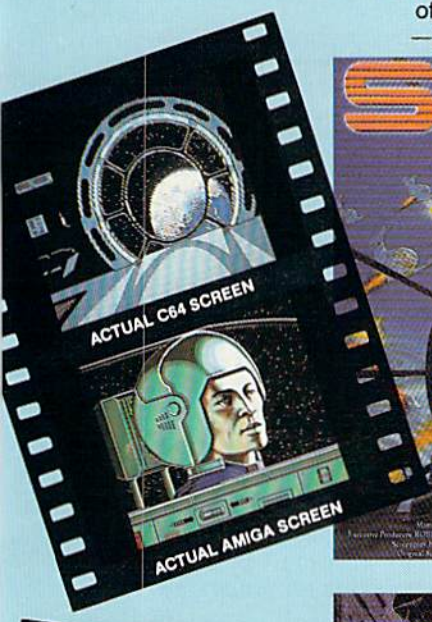

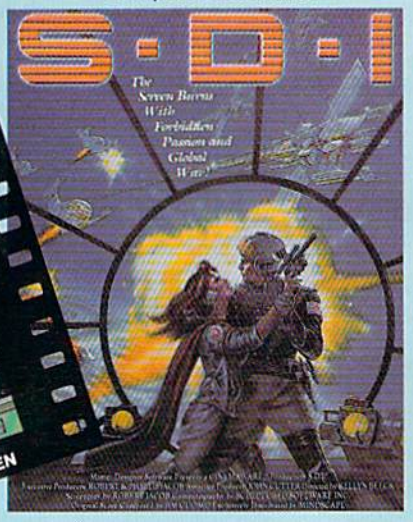

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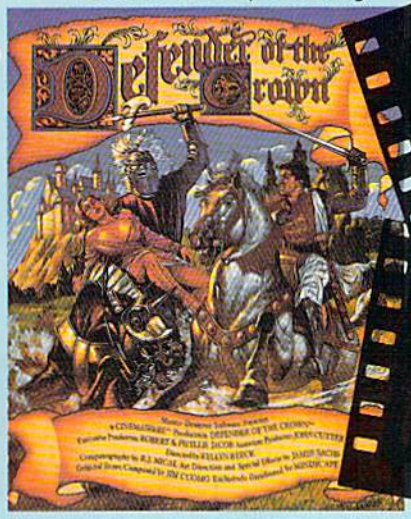

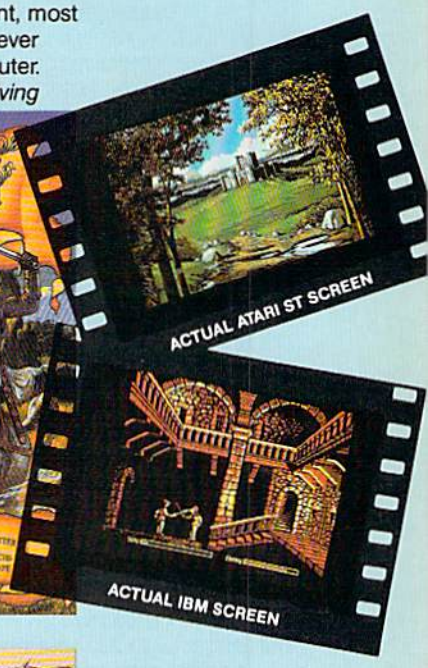

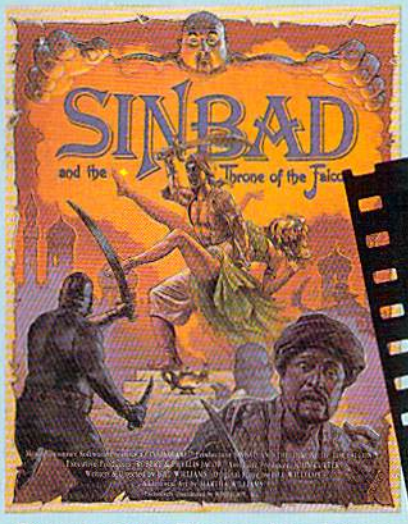

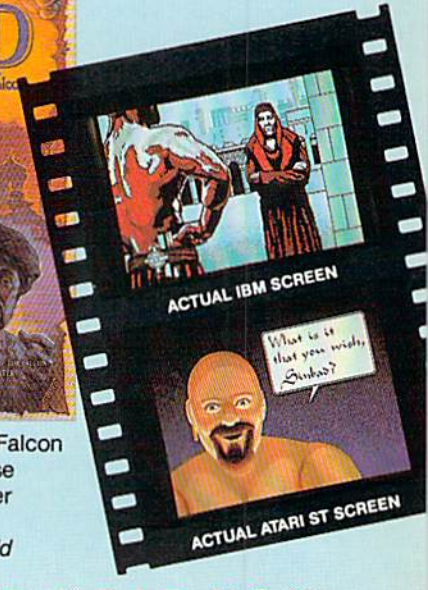

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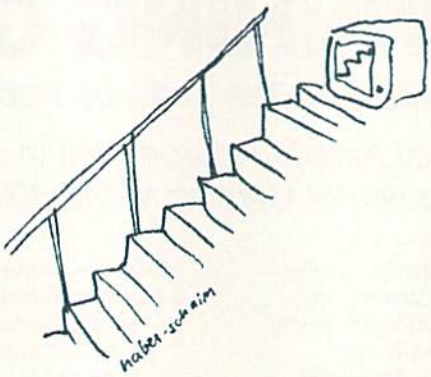
```
    , OTHERWISE HIT ANY OTHER K
    EY TO O.K. SALE":GETKEYA$:S
    V=SS*CP(N)              :REM*22
66Ø IFA$="C"THEN 74Ø        :REM*132
67Ø IFSS>SO(N)THEN7ØØ       :REM*124
68Ø SO(N)=SO(N)-SS:IFSO(N)=ØTHE
    N GOSUB 75Ø             :REM*192
69Ø GOTO72Ø                 :REM*19Ø
7ØØ SO(N)=SO(N)-SS:SS=ABS(SO(N)
    ):GOSUB75Ø              :REM*82
71Ø IFN=ØTHEN72Ø:ELSEN=N-1:GOTO
    67Ø                     :REM*228
72Ø PRINT"YOU SHOULD BE RECEIVI
    NG A CHECK FOR ";:PRINTUSIN
    G"$####.##";SV;:PRINT" MINU
    S THE COMMISSION"       :REM*52
73Ø INPUT "ANY MORE SALES....IN
    PUT Y/N";R$:IFR$="Y"THEN SC
    NCLR:GOTO46Ø            :REM*92
74Ø POKE235,Ø:PRINT"":PRINT"FIL
    E IN MEMORY ":SCNCLR:GOTO35
    Ø                       :REM*2Ø4
75Ø FORI=NTOS:SN$(I)=SN$(I+1):S
    O(I)=SO(I+1):PP(I)=PP(I+1):
    CP(I)=CP(I+1):NEXT      :REM*162
76Ø S=S-1:RETURN            :REM*13Ø
77Ø SCNCLR:IFS=ØTHEN95Ø:ELSE{2
    SPACEs}POKE235,Ø:PRINT"":PR
    INT"LIST MODE{6 SPACEs}"
                            :REM*27
78Ø CHARØ,Ø,Ø:PRINTTAB(3Ø)OD$"
    REPORT":TV=Ø            :REM*119
79Ø PRINT"{2 SPACEs}STOCK NAME{
    3 SPACEs}"TAB(25)"SHARES{6
    SPACEs}"TAB(37)"PURCHASE{3
    SPACEs}"TAB(48)"CURRENT{2 S
    PACEs}"TAB(6Ø)"TOTAL VALUE"
    TAB(74)"GAIN/"          :REM*75
8ØØ PRINTTAB(25)"OWNED"TAB(37)"
    PRICE"TAB(48)"PRICE"TAB(74)
    "LOSS"                  :REM*1Ø1
81Ø FORI=1TO8Ø:PRINT"{COMD T}";
    :NEXT:WINDOW Ø,8,79,2Ø:PRIN
    TCHR$(27)+"L":REM ENABLE SC
    RL                      :REM*2Ø5
82Ø X=1Ø                    :REM*73
83Ø FORI=1TOS:PRINTLEFT$(SN$(I)
    ,2Ø)TAB(24);:PRINTUSING"###
    #.####";SO(I);:PRINTTAB(37)
    ;:PRINTUSING T3$;PP(I);
                            :REM*47
84Ø IFCP(I)=Ø THEN CP(I)=PP(I)
                            :REM*2Ø9
85Ø PRINTTAB(47);:PRINTUSING T3
    $;CP(I);:PRINTTAB(59);:PRIN
    TUSING T6$;(SO(I))*CP(I);:P
    RINTTAB(71);:PRINTUSING T4$
    ;(SO(I))*(CP(I))-(SO(I))*(P
    P(I))                   :REM*79
86Ø TV=TV+(SO(I)*CP(I)):X=X-1:I
    FX=1THENX=1Ø:PRINT"{CTRL 5}
    HIT ANY KEY TO CONTINUE....
    .":GETKEYR$:PRINT"{CRSR UP}
    "CHR$(27)+"Q";:COLOR5,2
                            :REM*2Ø7
87Ø NEXT                    :REM*115
88Ø COLOR5,5:PRINT:PRINTTAB(38)
    "TOTAL MARKET VALUE = ";:PR
    INTUSING T6$;TV         :REM*63
```



```
89Ø COLOR5,2:PRINT"OUTPUT REPOR
    T TO PRINTER ......Y/N ";:P
    RINTCHR$(15)"?":GETKEY R$:P
    RINTCHR$(27)+"M":REM DISABL
    E SCROLLING             :REM*3
9ØØ IFR$<>"Y"THENPOKE235,Ø:PRIN
    T"":PRINT"FILE IN MEMORY ":
    GOTO96Ø                 :REM*65
91Ø IFR$="Y"THEN WINDOW Ø,4,79,
    2Ø:SCNCLR:GOSUB177Ø     :REM*35
92Ø WINDOW Ø,4,79,2Ø:SCNCLR:GOT
    O35Ø                    :REM*235
93Ø WINDOW Ø,4,79,2Ø:SCNCLR:POK
    E235,Ø:PRINT"":PRINT"FILE I
    N MEMORY "              :REM*255
94Ø GOTO35Ø                 :REM*2Ø1
95Ø POKE235,Ø:PRINT"":PRINT"FIL
    E EMPTY{5 SPACEs}"      :REM*19
96Ø WINDOW Ø,4,79,2Ø:SCNCLR:GOT
    O35Ø                    :REM*19
97Ø IF S=ØTHEN95Ø:ELSE SCNCLR:P
    OKE235,Ø:PRINT"":PRINT"PURC
    HASE STOCK "            :REM*231
98Ø CHARØ,Ø,2:FORI=1TOS     :REM*65
99Ø IFI>STHEN1Ø5Ø           :REM*187
1ØØØ IFSN$(I)=SN$(I+1)THENI=I+1
    :GOTO99Ø:REM DELETE DUPLIC
    ATES                    :REM*3
1Ø1Ø PRINTI;TAB(4);SN$(I);:I=I+
    1                       :REM*241
1Ø2Ø IFI>STHEN1Ø5Ø           :REM*217
1Ø3Ø IFSN$(I)=SN$(I+1)THEN I=I+
    1:GOTO1Ø2Ø:REM DELETE DUPL
    ICATES                  :REM*214
1Ø4Ø PRINTTAB(4Ø);I;SN$(I):NEXT
                            :REM*184
1Ø5Ø PRINT:PRINT"IS STOCK TO BE
     PURCHASED ONE OF THE ABOV
    E....Y/N";:INPUTR$:REM*188
1Ø6Ø IFR$="Y"THEN INPUT "ENTER
    STOCK NUMBER";R:GOTO111Ø
                            :REM*164
1Ø7Ø IFR$="N"THEN INPUT "IS THI
    S A NEW STOCK ";R$:IFR$="Y
    "THENS=S+1:I=S:GOSUB121Ø
                            :REM*174
1Ø8Ø PRINT"{2 CRSR UPs}";CHR$(2
    7)+"@";:GOTO1Ø5Ø        :REM*156
1Ø9Ø PRINT:INPUT"ANY MORE .....
    ...Y/N";R$:IFR$="Y"THENS=S
    +1:I=S:GOSUB121Ø:GOTO1Ø9Ø
                            :REM*46
11ØØ IFR$<>"Y"THEN9ØØ       :REM*86
111Ø IFR>S THEN PRINT"{2 CRSR D
    Ns} BAD STOCK NUMBER.....R
    E-ENTER":SLEEP2:PRINT"{6 C
    RSR UPs}"CHR$(27)+"@";:GOT
    O1Ø5Ø                   :REM*156
112Ø SS=S:REM SAVE S        :REM*2ØØ
113Ø FORI=1TO(S-R)          :REM*142
114Ø SN$(S+1)=SN$(S):SO(S+1)=SO
    (S):PP(S+1)=PP(S):CP(S+1)=
    CP(S):S=S-1:NEXT        :REM*148
115Ø SN$(R+1)=SN$(R):I=R+1:S=SS
    :S=S+1                  :REM*74
116Ø SCNCLR:PRINTSN$(I):PRINT:I
    NPUT"NUMBER OF SHARES TO B
    UY";SO(I)               :REM*138
117Ø PRINT:INPUT"INPUT PRICE PE
    R SHARE";PP(I):CP(I)=CP(I-
    1):GOTO77Ø              :REM*156
118Ø IFFL=1 THEN PRINT"{2 CRSR
    DNs}FILE IN MEMORY...TO CO
    NTINUE WILL DESTOY CURRENT
     FILE !":INPUT"ENTER {CTRL
     9}Y{CTRL Ø} OR {CTRL 9}N{
    CTRL Ø} TO CONTINUE";R$:IF
    R$="N"THENSCNCLR:GOTO35Ø
                            :REM*254
119Ø SCNCLR:POKE235,Ø:PRINT"":P
    RINT"INITIALIZE FILE"
                            :REM*224
12ØØ I=1:S=Ø                :REM*42
121Ø SCNCLR:INPUT"{CTRL 9}{2 CR
    SR DNs}ENTER STOCK NAME...
    ...MAX 24 CHARACTERS {CTRL
    Ø}";SN$(I)              :REM*58
122Ø IF SN$(I)=""THEN121Ø
                            :REM*196
123Ø IFLEN (SN$(I))>24THENPRINT
    "{CRSR UP}"CHR$(27)+"@":GO
    TO121Ø                  :REM*62
124Ø PRINT:INPUT"{CTRL 9}ENTER
    NUMBER OF SHARES OWNED ...
    .EX 4.25{CTRL Ø}";SO(I)
                            :REM*32
125Ø IF SO(I)=Ø THEN CHAR Ø,Ø,3
    :GOTO124Ø               :REM*Ø
126Ø PRINT:INPUT"{CTRL 9}ENTER
    PER SHARE COST....EX 8 1/4
     = 8.25 {CTRL Ø}";PP(I)
                            :REM*218
127Ø IF PP(I)=Ø THEN CHAR Ø,Ø,5
    :GOTO126Ø               :REM*8Ø
128Ø CP(I)=PP(I):S=S+1:I=I+1
                            :REM*2Ø3
129Ø PRINT:INPUT"ANY MORE .....
    ...Y/N";R$              :REM*255
13ØØ IF R$="Y" THEN SCNCLR:GOTO
    121Ø                    :REM*159
131Ø SCNCLR:FL=1:POKE235,Ø:PRIN
    T"":PRINT"FILE IN MEMORY "
                            :REM*171
132Ø GOSUB2Ø2Ø:POKE235,Ø:PRINT"
    "                       :REM*99
133Ø IF NS=1 THEN PRINT"FILE NO
    T SAVED ":SCNCLR:GOTO35Ø
                            :REM*197 ►
```

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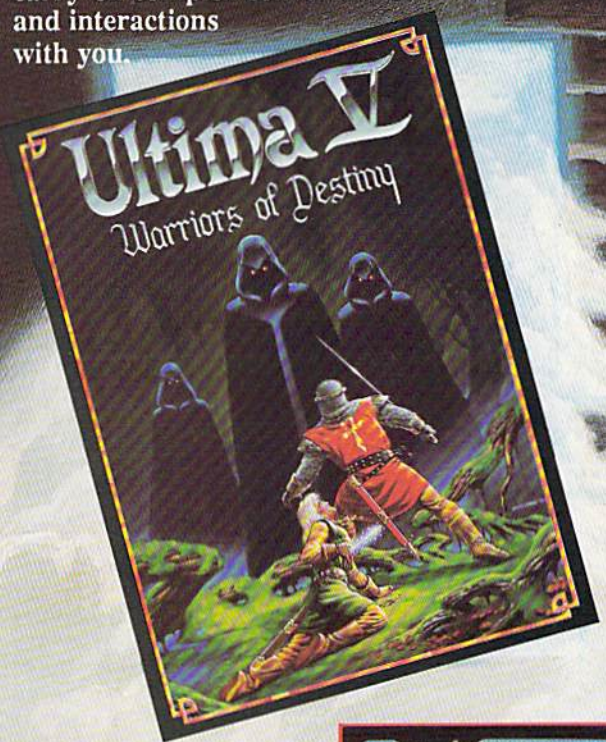

Screen displays shown from the Apple™. Others may vary. Allows the use of Ultima IV characters. No previous Ultima experience required.

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```
134Ø IF FS=1 THEN PRINT"FILE SA
     VED{5 SPACEs}":SCNCLR:GOTO
     35Ø                    :REM*241
135Ø IFFL=1 AND FS=Ø THEN POKE2
     35,Ø:PRINT"":PRINT"END PRO
     GRAM{4 SPACEs}":GOTO137Ø
                            :REM*93
136Ø PRINT"{2 HOMEs}":SCNCLR:EN
     D                      :REM*1Ø1
137Ø CHAR Ø,Ø,5:PRINT"FILE IN M
     EMORY NOT SAVED.....IF YOU
      CONTINUE YOU WILL LOSE FI
     LE":INPUT"CONTINUE.......Y
     /N";R$                 :REM*89
138Ø IFR$="Y"THEN GOTO136Ø
                            :REM*29
139Ø SCNCLR:POKE235,Ø:PRINT"":P
     RINT"FILE IN MEMORY ":GOTO
     35Ø                    :REM*165
14ØØ IF FL=Ø OR S=Ø THEN95Ø:ELS
     E SCNCLR:POKE235,Ø:PRINT""
     :PRINT"UPDATE PRICE{3 SPAC
     Es}"                   :REM*27
141Ø CHARØ,Ø,1:PRINT"{COMD 8}EN
     TER {CTRL 2}{CTRL 9}Y{CTRL
      Ø}{COMD 8} TO CHANGE, {CT
     RL 9}{CTRL 2}N{CTRL Ø}{COM
     D 8} OR {CTRL 9}{CTRL 2}RE
     TURN{CTRL Ø}{COMD 8} FOR N
     O CHANGE {CTRL 2}"  :REM*7
142Ø PRINT" NO.{3 SPACEs}STOCK
     NAME{14 SPACEs}CUR PRICE{5
      SPACEs}NEW PRICE":REM*167
143Ø PRINT"{55 COMD Ts}" :REM*7
144Ø FORI=1TOS              :REM*27
145Ø PRINTI;TAB(5);SN$(I);TAB(3
     1);:PRINTUSING"#$##.##";CP
     (I);:PRINTTAB(45);"CHANGE
     ?":GETKEYR$            :REM*113
146Ø PRINT"{CRSR UP}"CHR$(27)+"
     Q";                    :REM*161
147Ø IF R$="N" OR R$=CHR$(13) T
     HEN GOTO155Ø           :REM*17
148Ø IF R$="Y" THEN PRINTI;TAB(
     5);SN$(I);TAB(31);:PRINTUS
     ING"#$##.##";CP(I);:PRINTT
     AB(45);:INPUTNP(I):OP(I)=C
     P(I):GOTO15ØØ          :REM*3
149Ø GOTO145Ø               :REM*125
15ØØ PRINT"{CRSR UP}"CHR$(27)+"
     Q";:PRINTI;TAB(5);SN$(I);T
     AB(31);:PRINTUSING"#$##.##
     ";CP(I);:PRINTTAB(45);:PRI
     NTUSING"#$##.##";NP(I)
                            :REM*63
151Ø PRINT"{2 CRSR DNs}{7 SPACE
     s}IS THIS CORRECT.....Y/N"
     ;:INPUTR$              :REM*7
152Ø IF R$="N" THEN CHARØ,Ø,4:P
     RINTCHR$(27)+"@";:GOTO145Ø
                            :REM*179
153Ø IF R$="Y" THEN CHARØ,Ø,4:P
     RINTCHR$(27)+"@";:CP(I)=NP
     (I):GOTO155Ø           :REM*131
154Ø PRINT"{3 CRSR UPs}";CHR$(2
     7)+"@";:GOTO151Ø       :REM*174
155Ø IFSN$(I+1)=SN$(I)THEN CP(I
     +1)=CP(I):I=I+1:GOTO155Ø
                            :REM*172
156Ø NEXT                   :REM*4Ø
157Ø PRINT"UPDATE COMPLETE":SLE
     EP2                    :REM*12Ø
158Ø SCNCLR:PRINT"DO YOU WISH T
     O UPDATE THE DISK FILE";:I
     NPUTR$                 :REM*128
159Ø IFR$="Y"THEN GOSUB2Ø2Ø:GOT
     O35Ø                   :REM*188
16ØØ SCNCLR:GOTO35Ø         :REM*32
161Ø SCNCLR:POKE235,Ø:PRINT"":I
     FS=ØTHENPRINT"FILE EMPTY{5
      SPACEs}":ELSE PRINT"SAVE
     FILE MODE "            :REM*178
162Ø CHAR Ø,Ø,1:IFS=ØTHEN PRINT
      "FILE EMPTY.....NO RECORD
     S TO SAVE !":SLEEP 2:SCNCL
     R:GOTO35Ø              :REM*26
163Ø GOSUB2Ø2Ø              :REM*13Ø
164Ø IF FL=1THEN POKE235,Ø:PRIN
     T"":PRINT"FILE IN MEMORY "
                            :REM*88
165Ø IF FS=1THEN POKE235,Ø:PRIN
     T"":PRINT"FILE SAVED...{2
     SPACEs}"               :REM*216
166Ø IF NS=1THEN POKE235,Ø:PRIN
     T"":PRINT"FILE NOT SAVED "
                            :REM*236
167Ø SCNCLR:GOTO35Ø         :REM*1Ø2
168Ø IFDS=Ø THEN E=Ø:RETURN
                            :REM*12Ø
169Ø SCNCLR:CHAR Ø,Ø,5:PRINTDS$
     :IFDS=62THENPRINT"IF STOCK
      FILE NOT ON THIS DISK, YO
     U MUST INITIALIZE FILE FIR
     ST USING F5"           :REM*52
17ØØ E=DS                   :REM*4
171Ø POKE235,Ø:PRINT"":PRINTCHR
     $(15)"DISK ERROR{5 SPACEs}
     "                      :REM*144
172Ø CHARØ,Ø,1Ø:PRINTTAB(2Ø)"PR
     ESS ANY KEY ...MAKE CORREC
     TION, TRY AGAIN"       :REM*236
173Ø GETKEYA$:SCNCLR        :REM*184
174Ø POKE235,Ø:PRINT"":PRINT"{1
     5 SPACEs}"             :REM*168
175Ø CLOSE1:CLOSE2:GOTO35Ø
                            :REM*144
176Ø GETKEYA$:PRINTASC(A$);:GOT
     O176Ø                  :REM*178
177Ø CHARØ,Ø,5:PRINT"POSITION P
     APER AT SCRIBE....."
                            :REM*34
178Ø PRINTCHR$(15)"{2 CRSR DNs}
     {4 SPACEs}HIT ANY KEY WHEN
      READY...":GETKEYA$
                            :REM*168
179Ø OPEN3,4:PRINT#3,CHR$(147):
     IFST<>ØTHENPRINT"{CRSR UP}
     CANNOT OPEN PRINTER CHANNE
     L......CHECK PRINTER !":PO
     KE235,Ø:PRINT"":PRINTCHR$(
     15)"CHECK PRINTER{2 SPACEs
     }"                     :REM*6Ø
18ØØ IFST<>ØTHEN CLOSE3:SLEEP3:
     SCNCLR:GOTO35Ø         :REM*81
181Ø POKE235,Ø:PRINT"":PRINTCHR
     $(15)"PRINTING ...{3 SPACE
     s}":SCNCLR             :REM*131
182Ø PRINT#3,"==========
     ==========
     ==========
     =========="            :REM*193
183Ø PRINT#3,CHR$(14)"{6 SPACEs
     }STOCK PORTFOLIO{3 SPACEs}
     ";DT$;CHR$(15)         :REM*2Ø1
184Ø PRINT#3,"==========
     ==========
     ==========
     ==========
     ==========
     ==========
     ==========
     ==========
     ==========
     ==========
     =========="            :REM*213
185Ø PRINT#3:PRINT#3        :REM*193
186Ø PRINT#3,"STOCK{4 SPACEs}ST
     OCK NAME{6 SPACEs}SHARES{6
      SPACEs}PURCH{6 SPACEs}CUR
     {8 SPACEs}TOTAL{7 SPACEs}G
     AIN/{3 SPACEs}"        :REM*145
187Ø PRINT#3," NO.{22 SPACEs}OW
     NED{6 SPACEs}PRICE{5 SPACE
     s}PRICE{7 SPACEs}VALUE{7 S
     PACEs}LOSS -{2 SPACEs}"
                            :REM*19
188Ø PRINT#3,"{79 COMD Ts}"
                            :REM*49
189Ø T$="#$###.##":TV$="#$#####
     ##.##"                 :REM*63
19ØØ S$=CHR$(29):TV=Ø:II=Ø:MI=Ø
     :FORI=1TOS:LG=(SO(I)*CP(I)
     )-(SO(I)*PP(I))        :REM*135
191Ø II=SO(I)*PP(I):MI=II+MI:TV
     (I)=SO(I)*CP(I):TV=TV(I)+T
     V:IFCP(I)=ØTHENCP(I)=PP(I)
                            :REM*81
192Ø PRINT#3,I;CHR$(16)"Ø6"LEFT
     $(SN$(I),17);CHR$(16)"23";
     :PRINT#3,USING"####.####";
     SO(I);:PRINT#3,CHR$(16)"34
     ";:PRINT#3,USING T$;PP(I);
                            :REM*2Ø3
193Ø PRINT#3,CHR$(16)"44";:PRIN
     T#3,USING T$;CP(I);
                            :REM*155
194Ø PRINT#3,CHR$(16)"53";:PRIN
     T#3,USING TV$;TV(I);
                            :REM*59
195Ø PRINT#3,CHR$(16)"7Ø";:PRIN
     T#3,USING T$;LG        :REM*143
196Ø NEXT                   :REM*185
197Ø PRINT#3:PRINT#3:PRINT#3,SP
     C(32)"TOTAL INVESTMENT{3 S
     PACEs}= ";:PRINT#3,USING T
     V$;MI                  :REM*2Ø5
198Ø PRINT#3:PRINT#3:PRINT#3,SP
     C(32)"TOTAL MARKET VALUE =
      ";:PRINT#3,USING TV$;TV
                            :REM*2Ø1
199Ø PRINT#3,CHR$(19)       :REM*177
2ØØØ CLOSE3:POKE235,Ø:PRINT"":P
     RINT"FILE IN MEMORY ":RETU
     RN                     :REM*89
2Ø1Ø POKE235,Ø:PRINT"":PRINT"FI
     LE IN MEMORY ":RETURN
                            :REM*223
2Ø2Ø CHAR Ø,Ø,5:R$="8":IF DD=2T
     HEN INPUT" OUTPUT FILE ON
     DRIVE {CTRL 9}8{CTRL Ø} OR
      {CTRL 9}9{CTRL Ø} OR {CTR
     L 9}B{CTRL Ø}OTH";R$
                            :REM*177
2Ø3Ø IFR$="8"ORR$="9"ORR$="B"TH ►
```

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DATE: 3 JUNE 2123
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TO: INTERCEPTOR COMMAND
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REPORTED HOSTILE ACTION AGAINST MANNED INSTALLATIONS CONFIRMED STOP
ALL VESSELS PROCEED SOONEST INHABITED SECTORS TROJAN GROUP STOP
EQUIP MAX WEAPONS LOAD STOP
SEEK AND DESTROY ALL UNIDENTIFIED MILITARY CRAFT STOP

THIS IS NOT REPEAT NOT A DRILL STOP
OPERATION CODE STATUS IS RED STOP
BEST LUCK STOP

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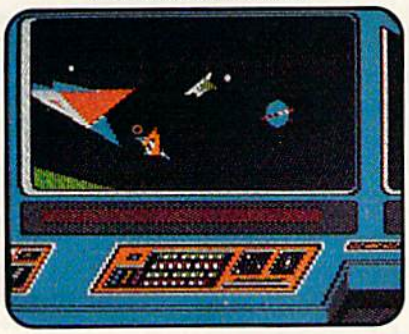
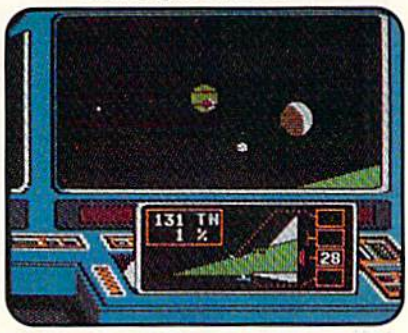
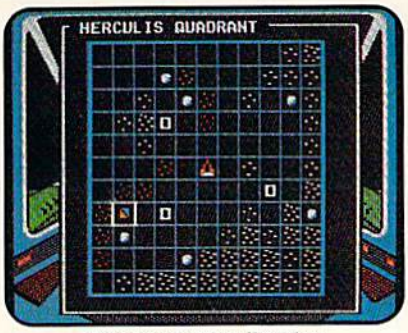


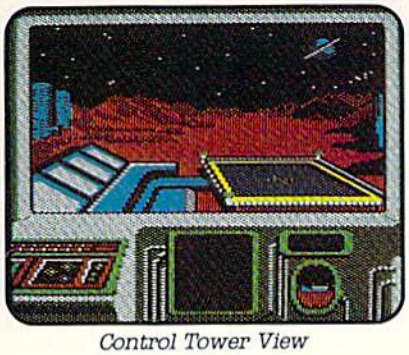
Forward Dashboard

Look-right Dashboard





Quadrant Map Display



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Run

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RUN INVESTOR

```
      EN2Ø4Ø:ELSE CHARØ,Ø,5:PRIN
      TCHR$(27)+"@";"{CRSR UP}":
      GOTO2Ø2Ø              :REM*5
2Ø4Ø  PRINT:PRINT"MAKE SURE PROP
      ER DISK IS IN DRIVE.....
      HIT ANY KEY WHEN READY!":G
      ETKEYA$               :REM*85
2Ø5Ø  IFR$="8"THEN2Ø8Ø       :REM*76
2Ø6Ø  IFR$="9"THEN DOPEN#1,"@STO
      CK FILE",DØ,U9,W:PRINT#1,D
      T$:IF ST<>Ø THEN GOSUB168Ø
      :NS=1:SLEEP2:RETURN
                            :REM*21Ø
2Ø7Ø  IFR$="9"THEN GOTO211Ø
                            :REM*1Ø
2Ø8Ø  DOPEN#1,"@STOCK FILE",DØ,U
      8,W:PRINT#1,DT$       :REM*186
2Ø9Ø  IF ST<>Ø THEN GOSUB168Ø:NS
      =1:SLEEP 2:RETURN :REM*142
21ØØ  IFR$="B" THENDOPEN#2,"@STO
      CK FILE",DØ,U9,W:PRINT#2,D
      T$:IF ST<>Ø THEN GOSUB168Ø
      :NS=1:SLEEP2:RETURN
                            :REM*224
211Ø  POKE235,Ø:PRINT"":PRINTCHR
      $(15)"SAVING .....{3 SPACE
      S}"                   :REM*16
212Ø  FORI=1TOS             :REM*198
213Ø  PRINT#1,SN$(I)        :REM*118
214Ø  PRINT#1,SO(I)          :REM*Ø
215Ø  PRINT#1,PP(I)         :REM*234
216Ø  PRINT#1,CP(I)          :REM*82
217Ø  IFR$="8"OR R$="9" THEN 222
      Ø                     :REM*168
218Ø  PRINT#2,SN$(I)        :REM*176
219Ø  PRINT#2,SO(I)          :REM*58
22ØØ  PRINT#2,PP(I)          :REM*36
221Ø  PRINT#2,CP(I)         :REM*14Ø
222Ø  IFST<>ØTHEN NS=1:RETURN
                            :REM*228
223Ø  IFST=ØTHEN NEXT       :REM*132
224Ø  IFR$="9" THEN CLOSE1
                            :REM*194
225Ø  IFR$="B" THEN CLOSE2
                            :REM*9Ø
226Ø  DCLOSE:FS=1:NS=Ø:POKE235,Ø
      :PRINT"":PRINT"FILE SAVED{
      5 SPACEs}":SCNCLR:RETURN
                            :REM*2Ø8
227Ø  REM VARIABLES USED IN PROG
      RAM                   :REM*252
228Ø  REM FL= FILE LOADED
                            :REM*148
229Ø  REM FS= FILE SAVED:REM*2Ø4
23ØØ  REM NS= FILE NOT SAVED
                            :REM*76
231Ø  REM SO= SHARES OWNED
                            :REM*1Ø5
232Ø  REM PP= PURCHASE PRICE
                            :REM*75
233Ø  REM CP= CURRENT PRICE
                            :REM*119
234Ø  REM OP= OLD PRICE :REM*225
235Ø  REM TV= TOTAL VALUE:REM*51
236Ø  REM S= NUMBER OF SHARES
                            :REM*237
237Ø  REM SN$= STOCK NAME
                            :REM*225
```

■

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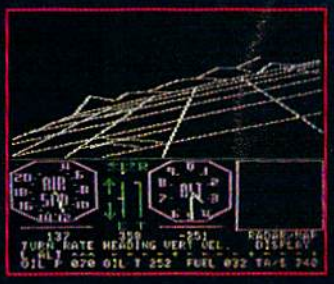
1987 - Expanding Scenery disk coverage; East Coast, Japan, & Europe

1986 - Flight Simulator II for the 68000 computers

1985 - High-performance Jet flight simulator for the IBM, Commodore 64, and Apple II computers

1982/1983 - Microsoft Flight Simulator & Flight Simulator II



1979 - 3D graphics applied to the original FS1 Flight Simulator for the new Apple II and TRS-80 computers

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Brickout!

Have a ball breaking through the moving brick walls.

By JOHN FEDOR

Tired of shooting aliens? Bored with lengthy sets of instructions? If so, boot up Brickout, a Pong-type game in which you score as a ball knocks bricks out of a wall. The challenge comes in using an on-screen paddle to keep the ball in play as it bounces around; the longer the ball's in play, the more bricks it knocks out. You get three balls per game, and when you've let all three escape, your turn is over. Brickout offers all the components of an exciting arcade game, with multi-player competition, a choice of difficulty levels and colorful graphics combined with imaginative sound effects.

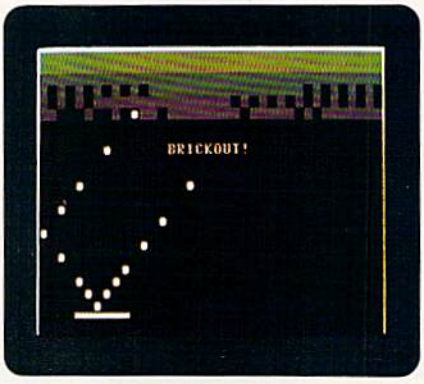
Begin by typing in Listing 1 and Listing 2, using 64 Perfect Typist, and saving them to disk. Then run Listing 2 to create the machine language file the game needs. (This is necessary only the first time you play.) Next, turn the computer off and on, then load and run Listing 1, the main program. Now, with a joystick plugged into port 2, you're ready to play.

As the game begins, a short tune plays and the title screen appears. Enter the number of players (1–4), each player's name and the speed at which he or she will play. The speed ranges from 1 to 3, with 1 being the fastest.

The next screen shows how many balls the current player has left (three at the beginning of the game). It also lists all the players' names and scores, with the active player's name highlighted.

Press the fire-button to set the ball in horizontal motion below the bricks, then press the button again to start the ball bouncing. Once it's bouncing, move the joystick left and right to slide the horizontal paddle across the bottom of the screen and keep the ball from escaping. If you miss the ball, it's lost.

The bricks are arranged in three rows of different colors: red, blue and green. Points, based on color, are awarded for knocking out the bricks. You receive five points for red bricks, ten for blue and 20 for green. When you've eliminated all the bricks of one color, they're automatically replaced.



The ball bounces high in Brickout.

When all the players have used up their three balls, the game is over. The final scores appear, and two options are presented. Pressing the fire-button restarts the game with the current settings; pressing return lets you choose new options before resuming play.

Note that the bricks of different colors scroll across the screen at different rates and in different directions. This makes it possible for the ball to reach the upper levels before the lower levels are completely gone. Also, the paddle shrinks with every 1000 points earned, which increases the level of difficulty for advanced players.

Now, get busy and warm up your throwing—er, joystick—arm! R

John Fedor, who especially enjoys math and working with his computer, is a freshman at the College of Lake County, in Illinois.

Listing 1. Brickout main program.

```
5 OPEN5,8,5,"BRICKOUT.ML,P,W":P
  RINT#5,CHR$(Ø)CHR$(192);
                          :REM*87
1Ø FORI=49152TO5Ø312:READA:PRIN
   T#5,CHR$(A);:NEXTI     :REM*72
2Ø CLOSE5                 :REM*64
3Ø PRINT"COMPLETE."       :REM*168
4Ø END                    :REM*42
1ØØ DATA 76,Ø,192,169,1,162,Ø,1
    42,32,2Ø8,142,33,2Ø8,157,Ø,
    216,157,Ø,217         :REM*164
11Ø DATA 157,Ø,218,157,Ø,219,23
    2,2Ø8,241,169,16Ø,162,Ø,157
    ,Ø,4,157,24,4         :REM*172
12Ø DATA 232,2Ø8,247,162,Ø,169,
    5,157,41,216,157,81,216,169
    ,6,157,121,216        :REM*212
13Ø DATA 157,161,216,169,2,157,
    2Ø1,216,157,241,216,232,224
    ,38,2Ø8,227,169       :REM*254
14Ø DATA Ø,133,251,169,4,133,25
    2,162,Ø,169,16Ø,16Ø,Ø,145,2
    51,16Ø,39,145         :REM*64
15Ø DATA 251,24,165,251,1Ø5,4Ø,
    133,251,165,252,1Ø5,Ø,133,2
    52,232,224,25         :REM*234
16Ø DATA 2Ø8,228,96,172,Ø,22Ø,1
    73,62,3,133,2,152,41,4,2Ø8,
    3,2Ø6,62,3,152        :REM*144
17Ø DATA 41,8,2Ø8,3,238,62,3,17
    4,62,3,224,1,176,5,162,1,14
    2,62,3,224,35         :REM*7Ø
18Ø DATA 144,5,234,2Ø2,142,62,3
    ,164,2,2Ø4,62,3,24Ø,24,176,
    12,169,32,153         :REM*32
19Ø DATA 152,7,169,226,157,156,
    7,2Ø8,1Ø,169,32,153,156,7,1
    69,226,157,152,7      :REM*254
2ØØ DATA 96,2Ø6,63,3,174,63,3,2
    Ø8,27,162,5,142,63,3,169,4Ø
    ,133,15Ø,169,4        :REM*194
21Ø DATA 133,151,32,38,193,169,
    8Ø,133,15Ø,169,4,133,151,32
    ,38,193,2Ø6,64,3      :REM*15Ø
22Ø DATA 174,64,3,2Ø8,27,162,1Ø
    ,142,64,3,169,12Ø,133,15Ø,1
    69,4,133,151,32       :REM*17Ø
23Ø DATA 239,194,169,16Ø,133,15
    Ø,169,4,133,151,32,239,194,
    2Ø6,65,3,174,65       :REM*88
24Ø DATA 3,2Ø8,27,162,15,142,65
    ,3,169,2ØØ,133,15Ø,169,4,13 ►
```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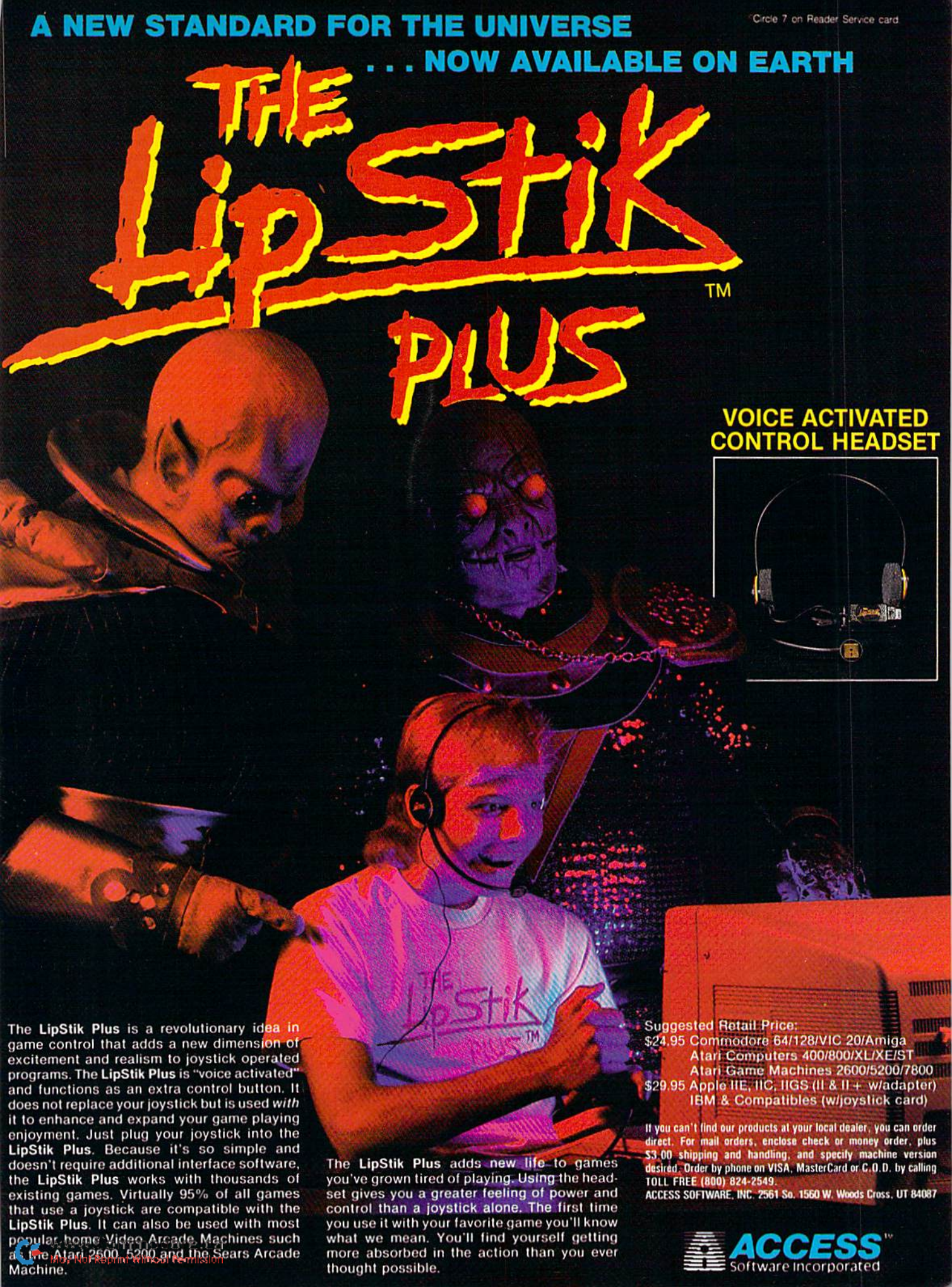
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```
    3,151,32,38,193     :REM*206
250 DATA 169,240,133,150,169,4,
    133,151,32,38,193,96,160,38
    ,177,150,133,2      :REM*198
260 DATA 136,177,150,200,145,15
    0,136,136,208,247,200,165,2
    ,145,150,96,169     :REM*109
270 DATA 0,133,251,169,4,133,25
    2,162,0,169,225,160,0,145,2
    51,169,97,160,39    :REM*111
280 DATA 145,251,232,24,165,251
    ,105,40,133,251,165,252,105
    ,0,133,252,224      :REM*9
290 DATA 25,208,226,169,108,141
    ,0,4,169,123,141,39,4,162,1
    ,169,98,157,0,4     :REM*115
300 DATA 232,224,39,208,248,96,
    206,68,3,174,68,3,240,1,96,
    162,2,142,68,3      :REM*149
310 DATA 24,173,60,3,105,41,133
    ,251,173,61,3,105,0,133,252
    ,174,66,3,224,1     :REM*67
320 DATA 208,13,56,165,251,233,
    2,133,251,165,252,233,0,133
    ,252,174,67,3       :REM*69
330 DATA 224,1,208,13,56,165,25
    1,233,80,133,251,165,252,23
    3,0,133,252,173     :REM*233
340 DATA 60,3,133,253,173,61,3,
    133,254,169,32,160,0,145,25
    3,177,251,133,2     :REM*119
350 DATA 24,165,252,105,212,133
    ,252,177,251,41,15,133,151,
    169,1,145,251,56    :REM*161
360 DATA 165,252,233,212,133,25
    2,164,2,192,98,208,5,162,2,
    142,67,3,192,97     :REM*17
370 DATA 208,5,162,1,142,66,3,1
    92,226,208,5,162,1,142,67,3
    ,192,225,208,5      :REM*243
380 DATA 162,2,142,66,3,192,108
    ,208,8,162,2,142,67,3,142,6
    6,3,192,123,208     :REM*51
390 DATA 9,162,1,142,66,3,232,1
    42,67,3,192,102,208,8,162,0
    ,142,66,3,142,67    :REM*129
400 DATA 3,192,160,208,47,165,1
    51,162,5,201,5,208,2,162,32
    ,201,6,208,2,162    :REM*67
410 DATA 16,134,151,120,248,24,
    173,69,3,101,151,141,69,3,1
    73,70,3,105,0       :REM*71
420 DATA 141,70,3,173,71,3,105,
    0,141,71,3,216,88,165,2,201
    ,32,240,46,165      :REM*145
430 DATA 151,162,16,201,32,208,
    2,162,32,201,16,208,2,162,2
    6,201,5,208,2       :REM*55
440 DATA 162,21,142,0,212,142,1
    ,212,234,162,16,165,251,201
    ,160,208,2,162      :REM*85
450 DATA 16,142,4,212,232,142,4
    ,212,165,2,41,15,208,10,165
    ,251,141,60,3       :REM*17
460 DATA 165,252,141,61,3,173,6
    0,3,133,251,173,61,3,133,25
    2,160,0,169,81      :REM*235
470 DATA 145,251,165,2,201,160,
    208,8,173,67,3,73,3,141,67,
    3,96,162,1,169,5    :REM*59
480 DATA 157,40,216,157,80,216,
    169,6,157,120,216,157,160,2
    16,169,2,157,200    :REM*9
490 DATA 216,157,240,216,232,22
    4,39,208,227,76,188,192,160
    ,1,177,150,133,2    :REM*253
500 DATA 200,177,150,136,145,15
    0,200,200,192,39,208,245,13
    6,165,2,145,150     :REM*183
510 DATA 96,162,1,169,0,157,192
    ,219,232,224,39,208,248,96,
    162,1,189,40,4      :REM*157
520 DATA 201,160,240,27,189,80,
    4,201,160,240,18,232,224,39
    ,208,237,162,38     :REM*44
530 DATA 169,160,157,40,4,157,8
    0,4,202,208,247,162,1,189,1
    20,4,201,160,240    :REM*66
540 DATA 27,189,160,4,201,160,2
    40,20,232,224,39,208,237,16
    2,1,169,160,157     :REM*54
550 DATA 120,4,157,160,4,232,22
    4,39,208,245,162,1,189,200,
    4,201,160,240,27    :REM*154
560 DATA 189,240,4,201,160,240,
    20,232,224,39,208,237,162,1
    ,169,160,157,200    :REM*126
570 DATA 4,157,240,4,232,224,39
    ,208,245,32,205,194,96,173,
    0,220,41,16,240     :REM*198
580 DATA 249,173,60,3,133,251,1
    73,61,3,133,252,169,2,141,6
    6,3,160,1,169,32    :REM*8
590 DATA 145,251,200,169,81,145
    ,251,32,196,195,192,38,208,
    240,169,1,141,66    :REM*246
600 DATA 3,160,38,169,32,145,25
    1,136,169,81,145,251,32,196
    ,195,192,1,208      :REM*52
610 DATA 240,76,147,195,132,253
    ,160,24,162,0,202,208,253,1
    36,208,250,32       :REM*178
620 DATA 111,192,32,205,194,164
    ,253,173,0,220,41,16,240,1,
    96,104,104,24       :REM*4
630 DATA 165,251,101,253,141,60
    ,3,165,252,105,0,141,61,3,9
    6,24,169,127,109    :REM*164
640 DATA 72,3,141,2,196,162,0,1
    89,40,4,157,0,0,232,208,247
    ,96,24,169,127      :REM*194
650 DATA 109,72,3,141,20,196,16
    2,0,189,0,0,157,40,4,232,20
    8,247,96,32,111     :REM*214
660 DATA 192,32,123,193,32,7,19
    5,173,61,3,201,6,208,3,32,2
    0,195,173,61,3      :REM*24
670 DATA 201,6,144,3,32,205,194
    ,160,10,162,0,202,208,253,1
    36,208,250,173      :REM*72
680 DATA 73,3,201,1,240,35,173,
    70,3,74,74,74,74,133,2,56,1
    69,5,229,2,133,2    :REM*30
690 DATA 205,73,3,240,36,141,73
    ,3,174,62,3,173,173,192,141
    ,110,196,169,32     :REM*60
700 DATA 157,152,7,165,2,24,105
    ,152,141,173,192,141,180,19
    2,56,169,39,229     :REM*80
710 DATA 2,141,148,192,173,66,3
    ,208,148,96         :REM*2
```

Listing 2. Brickout ML creator.

```
10 IFA=0THENA=1:LOAD "BRICKOUT.
   ML",8,1              :REM*80
20 POKE5328*0,14:POKE53281,0
                        :REM*190
30 FORI=54272TO54296:POKEI,0:NE
   XT:POKE54296,15      :REM*200
40 PRINT"{SHFT CLR}{CTRL 2}{COM
   D D}{2 COMD Is}{2 SPACEs}{CO
   MD D}{2 COMD Is}{2 SPACEs}{C
   OMD D}{3 COMD Is}{2 SPACEs}{
   2 COMD Is}{2 SPACEs}{COMD D}
    {COMD D}{2 SPACEs}{COMD D}{
   2 COMD Is}{COMD F} {COMD D}{
   2 SPACEs}{COMD F} {COMD D}{3
    COMD Is}"           :REM*60
50 PRINT"{CTRL 9}{COMD K}{CTRL
   0}{2 SPACEs}{COMD K} {CTRL 9
   }{COMD K}{CTRL 0}{2 SPACEs}{
   COMD K}{3 SPACEs}{COMD K}{2
   SPACEs}{CTRL 9}{COMD K}{CTRL
    0}{4 SPACEs}{CTRL 9}{COMD K
   }{CTRL 0}{COMD D}{COMD V}{2
   SPACEs}{CTRL 9}{COMD K}{CTRL
    0}{2 SPACEs}{COMD K} {CTRL
   9}{COMD K}{CTRL 0}{2 SPACEs}
   {COMD K}{3 SPACEs}{COMD K}"
                        :REM*88
60 PRINT"{CTRL 9}{COMD K}{2 COM
   D Is}{CTRL 0}{COMD F} {CTRL
   9}{COMD K}{COMD F}{COMD I}{C
   TRL 0}{4 SPACEs}{COMD K}{2 S
   PACEs}{CTRL 9}{COMD K}{CTRL
   0}{4 SPACEs}{CTRL 9}{COMD K}
   {CTRL 0}{COMD B}{3 SPACEs}{C
   TRL 9}{COMD K}{CTRL 0}{2 SPA
   CEs}{COMD K} {CTRL 9}{COMD K
   }{CTRL 0}{2 SPACEs}{COMD K}{
   3 SPACEs}{COMD K}"   :REM*120
70 PRINT"{CTRL 9}{COMD K}{CTRL
   0}{2 COMD Is}{COMD V} {CTRL
   9}{COMD K}{CTRL 0} {COMD B}{
   2 SPACEs}{COMD D}{COMD I}{CT
   RL 9}{COMD C}{CTRL 0}{COMD I
   } {COMD C}{2 COMD Is}{2 SPAC
   Es}{CTRL 9}{COMD K}{CTRL 0}
   {COMD B}{2 SPACEs}{CTRL 9}{C
   OMD K}{CTRL 0}{2 COMD Is}{CO
   MD K} {CTRL 9}{COMD K}{CTRL
   0}{2 COMD Is}{COMD K}{3 SPAC
   Es}{COMD K}"         :REM*164
80 PRINTTAB(13)"{3 CRSR DNs}BY:
    JOHN FEDOR"         :REM*184
90 GOSUB560             :REM*164
100 PRINT"{2 CRSR DNs}{4 SPACEs
    }HOW MANY PLAYERS (1-4) ?{2
    SPACEs}{CRSR LF}";:A$(1)="
    {SHFT B}{CRSR LF}":A$(2)="{
    SHFT N}{CRSR LF}":A$(3)="{S
    HFT C}{CRSR LF}"    :REM*64
110 A$(4)="{SHFT M}{CRSR LF}"  ►
```


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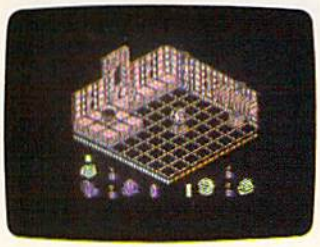

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BRICKOUT

```
                                :REM*136
12Ø GETP$:IFP$=>"1"ANDP$<="4"TH
    EN16Ø                       :REM*234
13Ø D=D+1:IFD<2THEN12Ø          :REM*23Ø
14Ø D=Ø:B=B+1:IFB=5THENB=1
                                :REM*94
15Ø PRINTA$(B);:GOTO12Ø:REM*252
16Ø PRINTP$:PL=VAL(P$)          :REM*2Ø
17Ø FORI=1TOPL:SC(I)=Ø:PRINT"{4
     SPACEs}{CRSR DN}PLAYER #"I
    "{CRSR LF}'S NAME ";:INPUTN
    $(I)                        :REM*114
18Ø PRINT"{5 SPACEs}SPEED (1-3)
     ";:INPUTSP(I)              :REM*178
19Ø IFSP(I)<1ORSP(I)>3ORSP(I)<>
    INT(SP(I))THEN18Ø           :REM*142
2ØØ NEXTI                       :REM*28
21Ø FORBA=1TO3:FORP=1TOPL:POKE8
    4Ø,P                        :REM*36
22Ø POKE54277,9                 :REM*118
23Ø POKE828,64:POKE829,5:POKE83
    Ø,16:POKE831,1:POKE832,1:PO
    KE833,1:POKE834,2           :REM*13Ø
24Ø POKE835,2:POKE836,2:POKE5Ø2
    34,1Ø*SP(P)                 :REM*1Ø6
25Ø PRINT"{SHFT CLR}":SYS49155:
    SYS49468:SYS49927           :REM*24
26Ø FORI=1Ø24+961TO1Ø24+998:POK
    EI,1Ø2:NEXTI:IFBA<>1THENSYS
    5Ø183                       :REM*2Ø1
27Ø PRINT"{HOME}{8 CRSR DNs}{4
    CRSR RTs}BALLS LEFT"4-BA:FO
    RI=1TOPL:PRINT:IFI=PTHENPRI
    NT"{CTRL 9}";               :REM*5
28Ø PRINTTAB(5)N$(I)TAB(2Ø)SC(I
    ):NEXTI                     :REM*161
29Ø SYS49869:IFPEEK(5632Ø)AND16
    THEN29Ø                     :REM*31
3ØØ PRINT"{HOME}{8 CRSR DNs}{4
    CRSR RTs}{15 SPACEs}":FORI=
    1TOPL:PRINT                 :REM*255
31Ø PRINTTAB(5)"{25 SPACEs}"
                                :REM*239
32Ø NEXTI:T1=INT(SC(P)/1ØØØ):L=
    5-T1:IFL<1THENL=Ø           :REM*91
33Ø POKE49325,L+152:POKE49332,L
    +152:POKE493ØØ,39-L:POKE841
    ,L                          :REM*89
34Ø FORI=ØTOL:POKE1Ø24+92Ø+PEEK
    (83Ø)+I,226:NEXTI           :REM*185
35Ø S$=STR$(SC(P)):S$=RIGHT$(S$
    ,LEN(S$)-1):S$=RIGHT$("ØØØØ
    ØØ"+S$,6)                   :REM*225
36Ø FORI=1TO6:S(I)=VAL(MID$(S$,
    I,1)):NEXTI                 :REM*175
37Ø S1=S(1)*16+S(2):S2=S(3)*16+
    S(4):S3=S(5)*16+S(6)
                                :REM*189
38Ø POKE837,S3:POKE838,S2:POKE8
    39,S1                       :REM*49
39Ø SYS5ØØ5Ø                    :REM*27
4ØØ SYS5Ø2Ø4:SYS5Ø162           :REM*89
41Ø S1=PEEK(837)AND15:S2=PEEK(8
    38)AND15:S3=PEEK(839)AND15
                                :REM*67
42Ø S4=INT(PEEK(837)/16):S5=INT
    (PEEK(838)/16):S6=INT(PEEK(
    839)/16)                    :REM*95
43Ø SC(P)=S6*1ØØØØØ+S3*1ØØØØ+S5
    *1ØØØ+S2*1ØØ+S4*1Ø+S1
                                :REM*133
44Ø NEXTP,BA                    :REM*159
45Ø SYS49869                    :REM*165
46Ø PRINT"{SHFT CLR}GAME OVER"
                                :REM*249
47Ø PRINT"{2 CRSR DNs}FINAL SCO
    RE:{CRSR LF}";:IFPL>1THENPR
    INT"S:";                    :REM*187
48Ø PRINT"{2 CRSR DNs}":FORI=1T
    OPL:PRINTN$(I)TAB(15)SC(I):
    PRINT:NEXTI                 :REM*2Ø1
49Ø PRINT"{2 CRSR DNs}PRESS <RE
    TURN> TO CHOOSE OPTIONS."
                                :REM*2Ø7
5ØØ PRINT"{CRSR DN}PRESS {CTRL
    9}FIRE{CTRL Ø} TO PLAY WITH
     SAME OPTIONS."             :REM*169
51Ø POKE198,Ø                   :REM*167
52Ø IF(PEEK(5632Ø)AND16)=ØTHEN5
    2Ø                          :REM*126
53Ø GETA$:IFA$=CHR$(13)THEN2Ø
                                :REM*198
54Ø IF(PEEK(5632Ø)AND16)=ØTHENF
    ORI=1TOPL:SC(I)=Ø:NEXTI:GOT
    O21Ø                        :REM*212
55Ø GOTO53Ø                     :REM*5Ø
56Ø REM MUSICAL INTRODUCTION
                                :REM*188
57Ø POKE54296,31:POKE54295,Ø:PO
    KE54294,255                 :REM*1Ø6
58Ø POKE54278,216:POKE54285,56
                                :REM*184
59Ø RESTORE:POKE54277,Ø:REM*116
6ØØ FORI=1TO17:READH,L,D:POKE54
    294,128+I*4                 :REM*152
61Ø POKE54273,H:POKE54272,L:POK
    E5428Ø,H*1.5:POKE54279,L*1.
    5                           :REM*18Ø
62Ø POKE54283,129:POKE54276,33:
    FORQ=1TOD:NEXTQ:POKE54283,1
    28:POKE54276,32             :REM*142
63Ø NEXTI                       :REM*2Ø4
64Ø READH,L                      :REM*46
65Ø POKE54273,H:POKE54272,L
                                :REM*164
66Ø DATA 2Ø,5,11Ø,2Ø,5,11Ø,18,8
    ,95,2Ø,5,12Ø,18,8,7Ø,15,2Ø,
    13Ø,18,8,9Ø,18,8            :REM*16Ø
67Ø DATA 9Ø,18,8,9Ø,2Ø,5,12Ø,18
    ,8,2ØØ,Ø,Ø,11Ø,2Ø,5,11Ø,2Ø,
    5,11Ø,18,8,95,2Ø            :REM*112
68Ø DATA 5,12Ø,18,8,7Ø,15,2Ø
                                :REM*156
69Ø POKE5428Ø,H:POKE54279,L
                                :REM*146
7ØØ POKE54283,129:POKE54295,1
                                :REM*4
71Ø POKE54276,33:FORQ=1TO3:FORI
    =ØTO255STEP8:POKE54294,I:NE
    XTI                         :REM*11Ø
72Ø FORI=255TOØSTEP-8:POKE54294
    ,I:NEXTI,Q                  :REM*146
73Ø POKE54276,32:POKE54283,128
                                :REM*2Ø8
74Ø FORI=ØTO23:POKE54272+I,Ø:NE
    XTI                         :REM*13Ø
75Ø POKE54296,15:RETURN         :REM*8
                                ■
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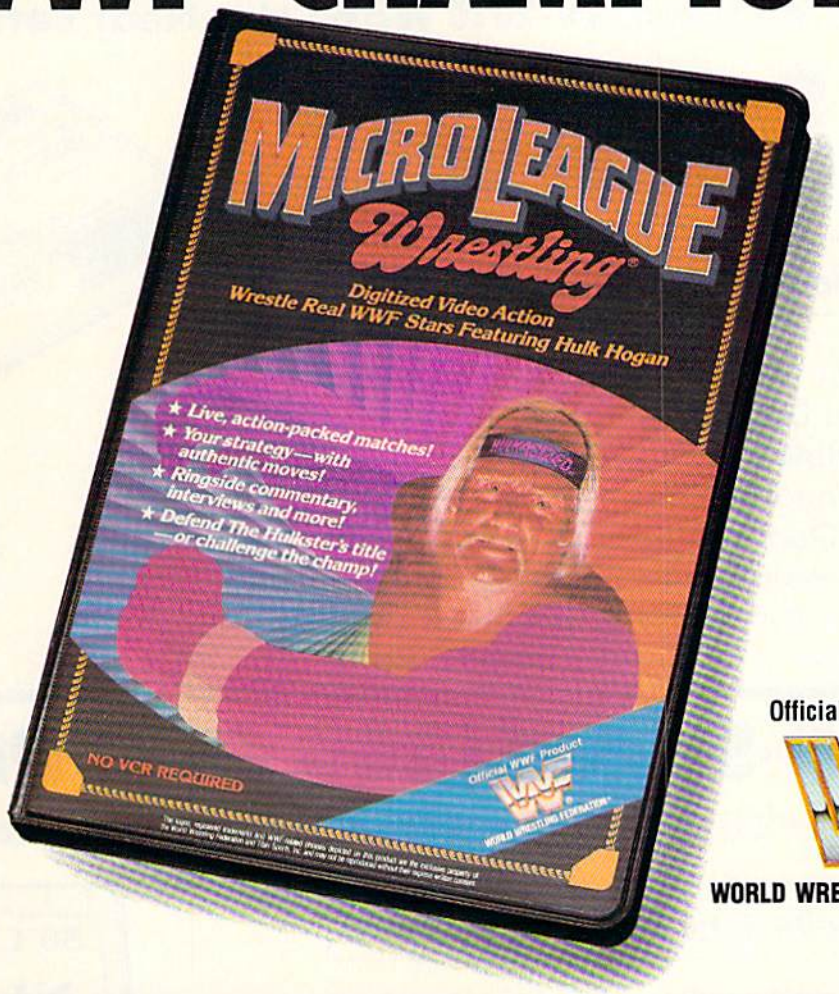

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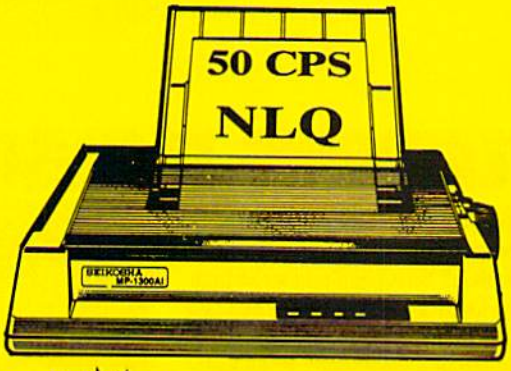

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A 1571 Clone Is Here!

With the introduction of the Excel 2001, Commodore's 1571 disk drive faces some floppy competition.

By TIM WALSH

Emerald Components' Excel 2001, a behavioral clone of Commodore's 1571 disk drive, is good news for C-128 users. Currently the only 1571 clone money can buy, it's a fine product that performs almost identically to the 1571 and lists for about $20 less.

For the benefit of those unfamiliar with its attributes, Commodore's 1571 disk drive transforms a C-128 into a faster, more efficient computer. While the 1571 works well, many users find its price rather high in comparison to other data-storage devices. An alternative does exist in the lowly 1541, but, unless you use some software or hardware enhancements, that drive's load speeds more closely resemble those of a Datassette than a disk drive. Commodore's 1581 3½-inch drive is also an alternative, but, at least at this writing, there's little commercial software available in 1581 format. Unfortunately, the prices of hard drives, an additional alternative, begin where a complete computer system (C-128, 1571 drive and 1902 monitor) leaves off. Considering these difficulties, it's clear there's a niche for a 1571 clone.

The Excel 2001 disk drive.

PHOTOGRAPHED BY LARRY DUNN

Physical Comparison

The Excel differs from the 1571 primarily in appearance. Its 3 × 6.75 × 11-inch dimensions make it narrower and shorter end-to-end than the 1571, which measures 3 × 8.5 × 13.6 inches, and it occupies slightly less desk space. These compact dimensions, along with its light beige color, make the Excel resemble a Commodore 1581 more closely than a 1571.

A separate 1.5 amp power supply, connected via a serial cable, provides power to the drive. Keeping the power supply separate enables the Excel to run cooler than the 1571, with its built-in power supply. After an hour or so of operation, the Excel does become warm to the touch, but not as warm as a 1571.

The Excel generates about the same amount of noise as a 1571 that's running well, and it's seemingly unaffected by copy-protected software, which makes a 1541 head sound like a jackhammer.

As on the 1571, you'll find two serial ports and a bank of DIP switches on the rear of the Excel.

Software Compatibility

In software compatibility, the Excel 2001 is a nearly flawless clone of the 1571. I've yet to find a 64 or 128 program it won't load. I now usually take the Excel, instead of a 1571, on Software Gallery photo shoots, because I have confidence in its ability to load commercial C-64 and C-128 programs. ►

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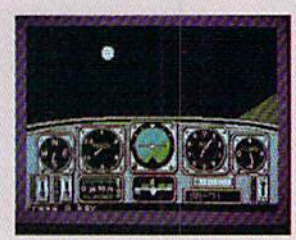

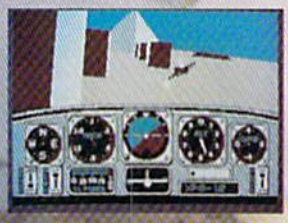

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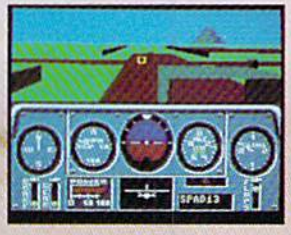

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Rather than naming the exhaustive list of software I've used with the Excel, suffice it to say that it loads and runs scores of copy-protected application, disk utility, word processor, database and graphics programs with no problem. Heavily copy-protected entertainment software from MicroProse, Accolade, Electronic Arts, Epyx and other major software manufacturers works perfectly on the Excel, as does Commodore's heavily protected Easy Script.

Table 1. Benchmark test results.

	Excel 2001	Commodore 1571
Disk formatting times:	42 sec.	46 sec.
Loading times:		
Fleet System III (128)	25 sec.	25 sec.
Vizawrite 128	1 min., 25 sec.	1 min., 25 sec.
30-block file	3.25 sec.	3.0 sec.
125-block file	8.5 sec.	8.0 sec.

PERFORMANCE

Formatting a disk takes about the same amount of time on the Excel as on a 1571 (see Table 1) and leaves the same 1328 disk blocks free. If you place the Excel in 1541 mode with a U0>M0 command, you'll have 664 blocks available on an empty formatted disk.

I ran comparison time trials on the Excel and the 1571 by executing the following benchmark program in fast (2 MHz) mode on a C-128:

```
0 REM C-128 DISK BENCHMARK - T.
  WALSH
10 FOR T=1 TO 10:
   DSAVE"TEST"+STR$(T):NEXT
20 FOR T=1 TO 10: SCRATCH
   "TEST"+STR$(T)
30 PRINT DS$: NEXT
40 CATALOG
```

After writing itself to disk in ten files, the program then scratches each file, printing the disk status between each scratch operation. Finally, it lists the disk directory to the screen.

The results of the trials show only minor time variations between the two drives, using empty formatted disks. The Excel wrote the ten files in 29 seconds and scratched them in 26 seconds, for a total elapsed time of 55 seconds. By comparison, the 1571's elapsed time totaled 59 seconds, including 30 seconds to write the files and 29 seconds to scratch them.

IN SUMMARY

If you're a C-128 owner, you'll undoubtedly be pleased with the Excel 2001's performance. Since the C-128D has a built-in 1571, owners of that computer can use the Excel as a device 9, 10 or 11 secondary drive. C-64 owners can take advantage of the Excel's fine software compatibility, its ability to quickly change device numbers and its double capacity compared to the 1541 (1328 vs. 664 blocks per disk).

Obviously, the Excel 2001 poses some competition for the 1571. It deserves serious consideration as an alternative to the 1571, and it should stimulate Commodore to lower the price on their drive. Available from Emerald Components (111 West 7th Ave., Suite 320, Eugene, OR 97401; 503-683-6910), the Excel's suggested retail price is $209, plus shipping and handling. ■

RUN's technical editor, Tim Walsh, is finally catching up on his sleep after many long nights of testing the 2001.

THE 1571 ROM CONTROVERSY

WITH THE POSSIBLE EXCEPTION of Commodore's 1984 decision to produce the C-16, few issues in computer circles generate more opinions and confusion than the 1571 ROM controversy. To set the record straight, early 1571 disk drives were produced with a ROM (read-only-memory) chip that suffers from a few minor bugs. The more serious bugs create an occasional problem with validating double-sided disks in 1541 mode and performing save-with-replaces, and make it impossible to load locked files in 1571 mode. Late-model 1571s come with a bug-free upgraded ROM, as does the C-128D's 1571.

Rumors continue to circulate, however. They range from simple advice to save an extra backup copy or two when using an early 1571, to the absurd warning that the 1571 is unsafe unless the new ROM is installed.

Having saved, written, scratched, loaded, read and splatted files while verifying, validating, initializing and formatting mountains of disks with plain-vanilla-ROM 1571s, I know that disk errors are infrequent. Sure, I've encountered a load error here and a validation error there, and I can't load locked files in 1571 mode, but still I've encountered far fewer problems with early-ROM 1571s than with 1541s and some third-party drives. You face a greater risk of damaging data on your disks by handling them with dirty hands or exposing them to ultrasonic humidifiers and household magnetic fields generated by electric motors than by using an original-ROM 1571.

Upgraded ROMs are available from both Commodore and Commodore service centers, and you can install them yourself or have the service center do it.

In case you're wondering whether your 1571 has an early or an upgraded ROM, you can tell by locking a file and then trying to load it in 1571 mode. If it loads, you probably have the new 1571 ROM. If you don't know how to lock a file, see Mega-Magic in the March 1987 issue of *RUN* or the March-April 1987 Re-RUN disk for a file-lock program. R

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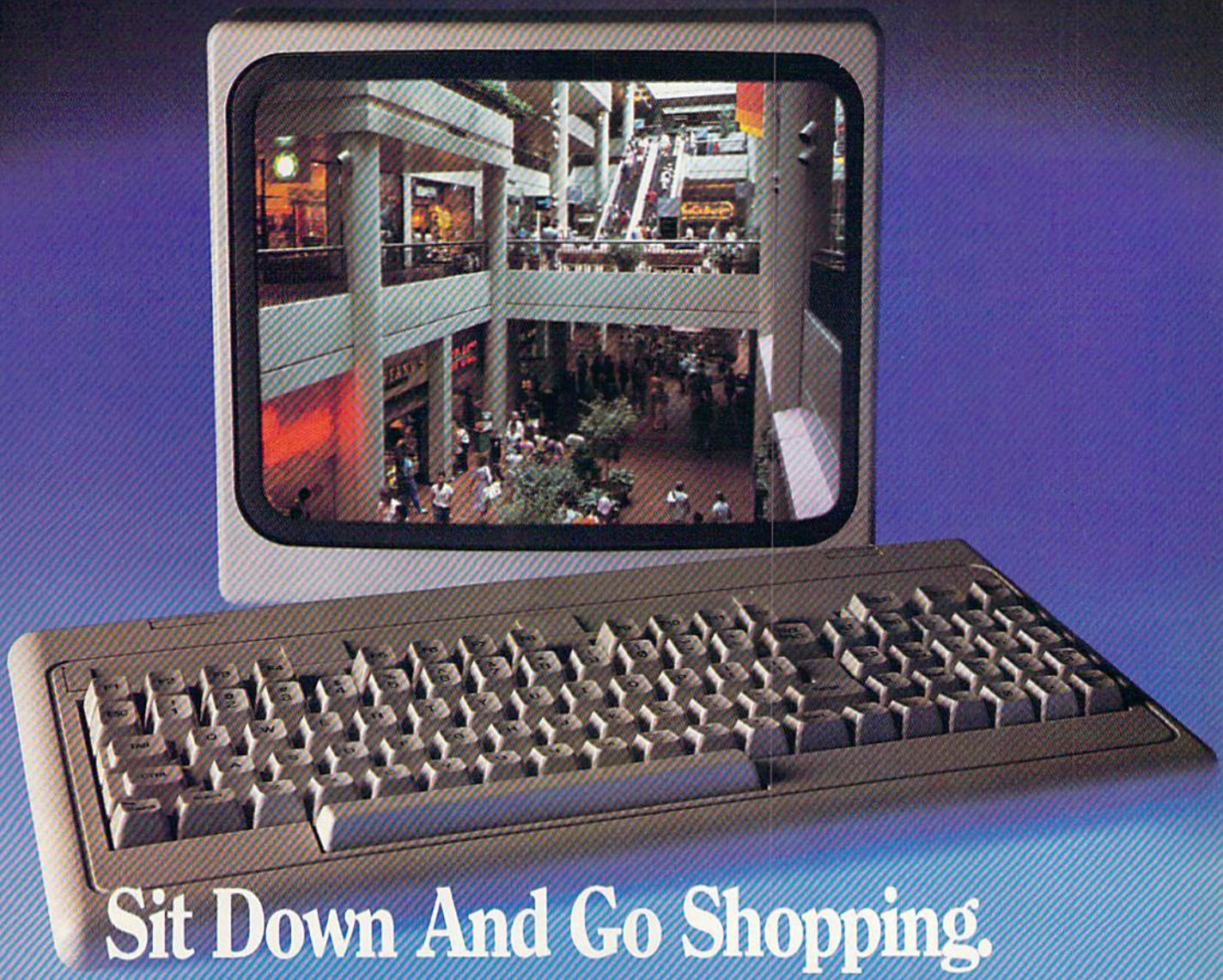

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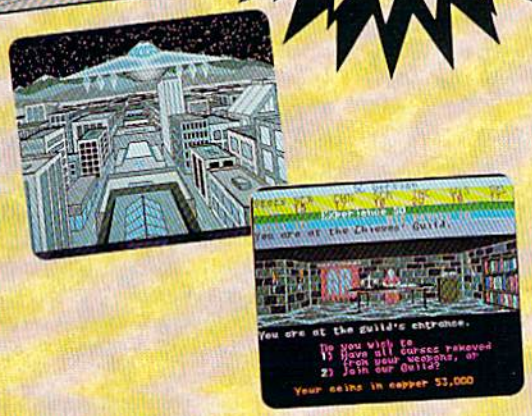

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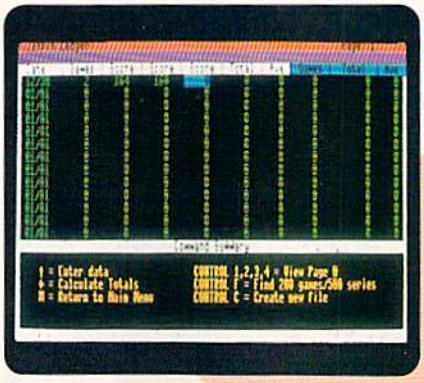
Tenpin Ledger

Spare yourself the trouble of keeping bowling records; let your Commodore do it instead.

By BARBARA SCHULAK

Bowling is a ball, especially during the cold and wet winter months. If you often head for the alley and keep records of your games, you'll love Tenpin Ledger. Written for the C-128 in 80-Column mode, this spreadsheet-like program stores game scores, calculates total pins and averages for each bowling session and keeps a running total and average from session to session. By creating a file for each individual or team, a league secretary could easily use this program to keep track of individual averages and team scores.



Ledger page, with cells for data and the command list.

The Main Menu

When you run Tenpin Ledger, the main menu, with six options, appears first. You can load a file, save a file, examine the ledger pages to make additions or changes, view the disk directory, print a file and exit. Just follow the prompts to execute any of these choices. Pressing only the return key at any prompt sends you back to the main menu without executing a routine.

The program creates sequential files and automatically adds the suffix .tp to their names to distinguish them from other files. You don't need to type this suffix with the filename when loading or saving a file.

Data Input and Calculations

Tenpin Ledger provides four ledger pages. Each page has room for 13 bowling sessions, so the program can handle a total of 52 sessions. Column headings for data you input include date of the bowling session, number of games rolled (1–3) in that session and scores for those games. Other headings, for which the program calculates the data, include total pins and average for the session, and cumulative number of games, pins and average. The bottom of the screen lists the various commands available in this editing mode.

When you access the ledger from the main menu, the first page of the ledger appears on the screen. Use the cursor keys to place the cursor on the cell where you want to enter or change data, then press the up-arrow key. When the word "enter" and a flashing cursor appear on the purple status line, type the data you want in the cell and press return. Enter the date in MO/YR format, such as 06/06 for June 6. If you press the return key without entering any data, the contents of the cell remain unchanged.

After you've entered all your data and made all your corrections, press the back-arrow key to make the program calculate the rest of the ledger sheet.

To move between the four pages of the ledger, press the control key and a number key (1–4) simultaneously. The current page number and filename are displayed on the top line.

When you're viewing a ledger page, you can find any games above 200 and any series score above 500 by pressing control/F. The scores will be highlighted in light red.

You can also erase the entire contents of a file to create a new file by pressing control/C. Since all current data is lost unless it's saved to disk, you'll be prompted to verify this choice.

If at any time you want to return to the main menu from the ledger, you can do so by pressing M.

Note that Tenpin Ledger's printing and calculating routines stop when they come to a zero in the number-of-games column, so make sure you don't skip any rows when entering your data.

Happy kegling! R

Barbara Schulak is a self-taught computer programmer and freelance writer with special interests in educational and home applications. ►

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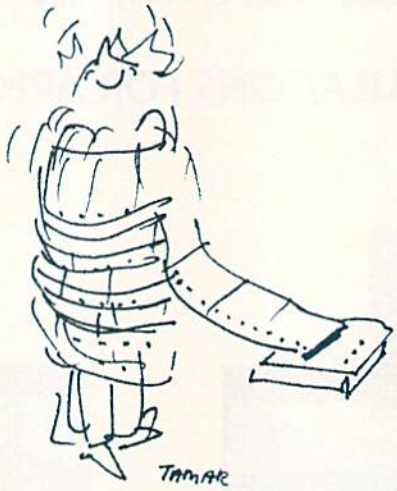
Circle 196 on Reader Service card.

TENPIN LEDGER

Listing 1. Tenpin Ledger program.

```
1Ø GRAPHIC5,1:PRINTCHR$(142):X=
   15:GOSUB2Ø7Ø          :REM*164
2Ø PRINT"{6 CRSR DNs}"TAB(28)CH
   R$(2);"{COMD 3}T E N P I N{3
    SPACEs}L E D G E R":REM*238
3Ø PRINTCHR$(X);"{3 CRSR DNs}"T
   AB(34)"{CTRL 2}{SHFT Q}{3 SP
   ACEs}{SHFT Q}{3 SPACEs}{SHFT
    Q}{3 SPACEs}{SHFT Q}"
                         :REM*8Ø
4Ø PRINTCHR$(X);TAB(36)"{SHFT Q
   }{3 SPACEs}{SHFT Q}{3 SPACEs
   }{SHFT Q}"            :REM*236
5Ø PRINTCHR$(X);TAB(38)"{SHFT Q
   }{3 SPACEs}{SHFT Q}" :REM*64
6Ø PRINTCHR$(X);TAB(4Ø)"{SHFT Q
   }"                    :REM*8Ø
7Ø PRINTCHR$(8)CHR$(14) :REM*7Ø
8Ø DIMD$(53),A(1Ø,53),TB(1Ø):GO
   SUB164Ø               :REM*Ø
9Ø FORI=1TO1Ø:READTB(I):NEXT
                         :REM*114
1ØØ DATA 2,9,17,25,33,42,49,56,
    67,73                :REM*188
11Ø PRINTCHR$(147)       :REM*142
12Ø :                    :REM*96
13Ø GOSUB152Ø            :REM*232
14Ø GETKEYK$             :REM*26
15Ø K=VAL(K$):IFK<1ORK>6THEN14Ø
                         :REM*138
16Ø PRINTCHR$(7)         :REM*246
17Ø IFK=6THENPRINT"{2 HOMEs}{SH
   FT CLR}":END          :REM*148
18Ø ONKGOSUB21Ø,32Ø,43Ø,98Ø,118
   Ø                     :REM*94
19Ø GOTO14Ø              :REM*184
2ØØ :                    :REM*176
21Ø WINDOW11,2,69,22:PRINT"{CRS
   R DN}"TAB(12)CHR$(15)"{CTRL
    8}{SHFT L}OAD {SHFT F}ILE"
                         :REM*142
22Ø WINDOW12,8,68,17:PRINT"{CRS
   R DN}{COMD 7}{2 SPACEs}{SHF
   T F}ILENAME: {CTRL 2}";:L=1
   2:TY=4:GOSUB169Ø:IFFL=ØTHEN
   29Ø                   :REM*226
23Ø F$=V$+".TP"          :REM*236
24Ø DOPEN#2,(F$),R       :REM*166
25Ø PRINT:PRINT:PRINT"{COMD 3}{
   2 SPACEs}{SHFT D}ISK {SHFT
   S}TATUS: {CTRL 2}"DS$:IFDS<
   >ØTHENGOSUB196Ø:GOTO28Ø
                         :REM*8
26Ø FORI=1TO52:INPUT#2,D$(I):NE
   XT                    :REM*181
27Ø FORI=1TO1Ø:FORJ=1TO52:INPUT
   #2,A(I,J):NEXT:NEXT:REM*173
28Ø DCLOSE#2             :REM*5
29Ø WINDOW12,8,68,17,1:PG=Ø:P=1
   :SC=Ø                 :REM*113
3ØØ WINDOW11,2,69,22:PRINT"{CRS
   R DN}"TAB(12)CHR$(143)"{CTR
   L 6}{SHFT L}OAD {SHFT F}ILE
   ":RETURN              :REM*39
31Ø :                    :REM*31
32Ø WINDOW11,2,69,22:PRINT"{CRS
   R DN}"TAB(39)CHR$(15)"{CTRL
```




```
   8}{SHFT S}AVE {SHFT F}ILE"
                         :REM*2Ø5
33Ø WINDOW12,8,68,17:PRINT"{CRS
   R DN}{COMD 7}{2 SPACEs}{SHF
   T F}ILENAME: {CTRL 2}";:L=1
   2:TY=4:GOSUB169Ø:IFFL=ØTHEN
   4ØØ                   :REM*49
34Ø F$=V$+".TP":SCRATCH (F$)
                         :REM*165
35Ø DOPEN#2,(F$),W       :REM*1Ø1
36Ø PRINT:PRINT:PRINT"{COMD 3}{
   2 SPACEs}{SHFT D}ISK {SHFT
   S}TATUS: {CTRL 2}"DS$:IFDS<
   >ØTHENGOSUB196Ø:GOTO39Ø
                         :REM*167
37Ø FORI=1TO52:PRINT#2,D$(I):NE
   XT                    :REM*115
38Ø FORI=1TO1Ø:FORJ=1TO52:PRINT
   #2,A(I,J):NEXT:NEXT:REM*1Ø7
39Ø DCLOSE#2             :REM*115
4ØØ WINDOW12,8,68,17,1:PG=Ø:P=1
   :SC=Ø                 :REM*223
41Ø WINDOW11,2,69,22:PRINT"{CRS
   R DN}"TAB(39)CHR$(143)"{CTR
   L 6}{SHFT S}AVE {SHFT F}ILE
   ":RETURN              :REM*59
42Ø :                    :REM*141
43Ø GOSUB2Ø8Ø:IFSCTHENPRINT"{CO
   MD 7}";:GOTO65Ø       :REM*163
44Ø SC=1:PRINT"{2 HOMEs}{SHFT C
   LR}{COMD 3}{CTRL 9}{2 SPACE
   s}{SHFT T}ENPIN {SHFT L}EDG
   ER:{64 SPACEs}";      :REM*81
45Ø PRINT"{HOME}"TAB(17)LEFT$(F
   $,(LEN(F$)-3))        :REM*11
46Ø PRINT"{HOME}"TAB(66)"{CTRL
   9}{SHFT P}AGE:"P      :REM*2Ø1
47Ø PRINT"{CTRL 9}{COMD 1}{8Ø S
   PACEs}";              :REM*199
48Ø PRINT"{CTRL 9}{CTRL 2}{2 SP
   ACEs}{SHFT D}ATE{3 SPACEs}{
   SHFT -} {SHFT G}AMES {SHFT
   -} {SHFT S}CORE {SHFT -} {S
   HFT S}CORE {SHFT -} {SHFT S
   }CORE {SHFT -} {SHFT T}OTAL
    {SHFT -} {SHFT A}VE {COMD
   7}{SHFT -} {SHFT G}AMES {SH
   FT -}{2 SPACEs}{SHFT T}OTAL
   {2 SPACEs}{SHFT -} {SHFT A}
   VE{2 SPACEs}"         :REM*91
49Ø FORI=1+PGTO13+PG     :REM*213
5ØØ PRINT"{CTRL 2}{CTRL 9} {CTR
   L Ø} {CTRL 6}";D$(I);:TB=1Ø
                         :REM*141
51Ø FORJ=2TO6            :REM*15
52Ø PRINTTAB(TB);:PRINTUSING"##
   ###";A(J,I);          :REM*222
53Ø TB=TB+8:NEXT         :REM*2Ø2
54Ø PRINTTAB(51);:PRINTUSING"##
   #";A(7,I);            :REM*2Ø8
55Ø PRINTTAB(58);:PRINTUSING"##
   #";A(8,I);            :REM*196
56Ø PRINTTAB(66);:PRINTUSING"##
   ####";A(9,I);         :REM*25Ø
57Ø PRINTTAB(75);:PRINTUSING"##
   #";A(1Ø,I);           :REM*54
58Ø PRINT" {CTRL 2}{CTRL 9} {CT
   RL Ø}";:NEXT          :REM*176
59Ø PRINT"{CTRL 9}{CTRL 2}{32 S
   PACEs}{SHFT C}OMMAND {SHFT
   S}UMMARY{33 SPACEs}{CTRL 7}
   "                     :REM*92
6ØØ FORI=1TO6:PRINT"{CTRL 9}{CT
   RL 2} {78 CRSR RTs} ";:NEXT
                         :REM*9Ø
61Ø PRINT"{CTRL 9}{CTRL 2}{8Ø S
   PACEs}{CTRL 7}"       :REM*12Ø
62Ø PRINT"{2 HOMEs}{17 CRSR DNs
   }":PRINTTAB(5)"{CTRL 8}{UP
   ARROW} = {SHFT E}NTER DATA{
   17 SPACEs}{SHFT C}{SHFT O}{
   SHFT N}{SHFT T}{SHFT R}{SHF
   T O}{SHFT L} 1,2,3,4 = {SHF
   T V}IEW {SHFT P}AGE #"
                         :REM*214
63Ø PRINTTAB(5)"{LEFT ARROW} =
   {SHFT C}ALCULATE {SHFT T}OT
   ALS{11 SPACEs}{SHFT C}{SHFT
    O}{SHFT N}{SHFT T}{SHFT R}
   {SHFT O}{SHFT L} {SHFT F} =
    {SHFT F}IND 2ØØ GAMES/5ØØ
   SERIES"               :REM*44
64Ø PRINTTAB(5)"{SHFT M} = {SHF
   T R}ETURN TO {SHFT M}AIN {S
   HFT M}ENU{8 SPACEs}{SHFT C}
   {SHFT O}{SHFT N}{SHFT T}{SH
   FT R}{SHFT O}{SHFT L} {SHFT
    C} = {SHFT C}REATE NEW FIL
   E{COMD 7}"            :REM*148
65Ø GOSUB191Ø:REMCHAR1,2,3,D$(R
   +PG),1                :REM*178
66Ø GETKEYK$             :REM*36
67Ø IFK$="{CRSR RT}"THENBEGIN:
                         :REM*168
68Ø GOSUB187Ø:C=C+1:IFC>5THENC=
   1:R=R+1:IFR>13THENR=13
                         :REM*188
69Ø GOSUB191Ø:BEND       :REM*136
7ØØ IFK$="{CRSR LF}"THENBEGIN:
                          :REM*6
71Ø GOSUB187Ø:C=C-1:IFC<1THENC=
   1                     :REM*5Ø
72Ø GOSUB191Ø:BEND       :REM*166
73Ø IFK$="{CRSR UP}"THENBEGIN:
                         :REM*3Ø
74Ø GOSUB187Ø:R=R-1:IFR<1THENR=
   1                     :REM*154
75Ø GOSUB191Ø:BEND       :REM*196
76Ø IFK$="{CRSR DN}"THENBEGIN: ►
```

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TENPIN LEDGER

```
                              :REM*252
77Ø GOSUB187Ø:R=R+1:IFR>13THENR
    =13                       :REM*153
78Ø GOSUB191Ø:BEND            :REM*227
79Ø IFK$="M"THENPRINTCHR$(7);:G
    OSUB2Ø7Ø:RETURN           :REM*189
8ØØ IFK$="{LEFT ARROW}"THENPRIN
    TCHR$(7);:GOSUB125Ø:REM TOT
    ALS                       :REM*185
81Ø IFK$="{CTRL 2}"THENPG=13:P=
    2:SC=Ø:PRINTCHR$(7);:GOTO43
    Ø:REM PAGE 2              :REM*173
82Ø IFK$="{CTRL 1}"THENPG=Ø:P=1
    :SC=Ø:PRINTCHR$(7);:GOTO43Ø
    :REM PAGE 1               :REM*225
83Ø IFK$="{CTRL 3}"THENPG=26:P=
    3:SC=Ø:PRINTCHR$(7);:GOTO43
    Ø:REM PAGE 3              :REM*55
84Ø IFK$="{CTRL 4}"THENPG=39:P=
    4:SC=Ø:PRINTCHR$(7);:GOTO43
    Ø:REM PAGE 4              :REM*235
85Ø IFK$="{CTRL F}"THENPRINTCHR
    $(7);:GOSUB14ØØ:REM FIND
                              :REM*183
86Ø IFK$="{CTRL C}"THENPRINTCHR
    $(7);:GOSUB2ØØØ:GOTO43Ø:REM
     NEW FILE                 :REM*11
87Ø IFK$<>"{UP ARROW}"THEN66Ø
                              :REM*131
88Ø PRINTCHR$(7);             :REM*1Ø3
89Ø PRINT"{HOME}{CRSR DN}{CTRL
    9}{COMD 1}{2 SPACEs}{SHFT E
    }NTER: ";                 :REM*1Ø3
9ØØ IFC=1THENL=5:TY=4:GOSUB169Ø
    :IFFLTHEND$(R+PG)=V$
                              :REM*153
91Ø IFC=2THENL=2:TY=2:GOSUB169Ø
    :IFFLTHENA(C,R+PG)=VAL(V$)
                              :REM*73
92Ø IFC>2THENL=4:TY=2:GOSUB169Ø
    :IFFLTHENA(C,R+PG)=VAL(V$)
                              :REM*71
93Ø GOSUB187Ø                 :REM*219
94Ø PRINT"{HOME}{CRSR DN}{COMD
    1}{CTRL 9}{18 SPACEs}"
                              :REM*2Ø5
95Ø K$="{CRSR RT}":GOTO67Ø
                              :REM*183
96Ø GOTO66Ø                     :REM*5
97Ø :                         :REM*181
98Ø WINDOW11,2,69,22:PRINT"{2 C
    RSR DNs}"TAB(39)CHR$(15)"{C
    TRL 8}{SHFT P}RINT {SHFT F}
    ILE"                      :REM*2Ø1
99Ø WINDOW12,8,68,17:PRINT"{CRS
    R DN}{COMD 7}{2 SPACEs}{SHF
    T P}RINTER READY [Y/N]
                              :REM*75
1ØØØ GETKEYK$:IFK$<>"Y"THEN115Ø
                              :REM*81
1Ø1Ø PRINT"{CRSR DN}{COMD 1}{2
     SPACEs}{SHFT P}RINTING..."
                              :REM*2Ø7
1Ø2Ø OPEN4,4,Ø                 :REM*139
1Ø3Ø PRINT#4,"{5 SPACEs}FILE: "
    ;LEFT$(F$,(LEN(F$)-3)):PRI
    NT#4                      :REM*166
1Ø4Ø PRINT#4,"{5 SPACEs}DATE{7
     SPACEs}#{3 SPACEs}SCORE{2
     SPACEs}SCORE{2 SPACEs}SCOR
    E{2 SPACEs}TOTAL{3 SPACEs}
    AVE{6 SPACEs}#{2 SPACEs}TO
    TAL{4 SPACEs}AVE" :REM*244
1Ø5Ø PRINT#4,"{5 SPACEs}";
                              :REM*23Ø
1Ø6Ø FORI=1TO68:PRINT#4,"{SHFT
    *}";:NEXT:PRINT#4 :REM*164
1Ø7Ø I=1                       :REM*2
1Ø8Ø DO UNTIL A(2,I)=Ø :REM*12Ø
1Ø9Ø PRINT#4,"{5 SPACEs}";
                              :REM*14
11ØØ PRINT#4,USING "#####";D$(I
    );:PRINT#4,"{2 SPACEs}";
                              :REM*42
111Ø FORJ=2TO1Ø                :REM*22
112Ø PRINT#4,USING "#####";A(J,
    I);:PRINT#4,"{2 SPACEs}";
                              :REM*14Ø
113Ø NEXT:PRINT#4:I=I+1:LOOP
                              :REM*7Ø
114Ø PRINT#4:CLOSE4           :REM*66
115Ø WINDOW12,8,68,17,1:PG=Ø:P=
    1:SC=Ø                    :REM*2Ø8
116Ø WINDOW11,2,69,22:PRINT"{2
    CRSR DNs}"TAB(39)CHR$(143)
    "{CTRL 6}{SHFT P}RINT {SHF
    T F}ILE":RETURN           :REM*17Ø
117Ø :                        :REM*126
118Ø WINDOW11,2,69,22:PRINT"{3
    CRSR DNs}"TAB(12)CHR$(15)"
    {CTRL 8}{SHFT V}IEW {SHFT
    D}ISK {SHFT D}IRECTORY{CTR
    L 2}"                     :REM*212
119Ø WINDOW12,8,68,17,1:WINDOW1
    7,9,68,17,1               :REM*3Ø
12ØØ DIRECTORY                :REM*112
121Ø GOSUB196Ø                :REM*228
122Ø WINDOW12,8,68,17,1:REM*142
123Ø WINDOW11,2,69,22:PRINT"{3
    CRSR DNs}"TAB(12)CHR$(143)
    "{CTRL 6}{SHFT V}IEW {SHFT
     D}ISK {SHFT D}IRECTORY":R
    ETURN                     :REM*12Ø
124Ø :                        :REM*196
125Ø PRINT"{HOME}{CRSR DN}{COMD
     1}{2 CRSR RTs}"CHR$(15)"{
    SHFT C}ALCULATING..."
                              :REM*12
126Ø PRINT"{HOME}{2 CRSR DNs}{C
    TRL 6}"                   :REM*5Ø
127Ø I=1:DO UNTIL A(2,I)=Ø
                              :REM*196
128Ø A(6,I)=A(3,I)+A(4,I)+A(5,I
    )                         :REM*253
129Ø A(7,I)=A(6,I)/A(2,I)
                              :REM*63
13ØØ A(8,I)=A(8,I-1)+A(2,I)
                              :REM*173
131Ø A(9,I)=A(9,I-1)+A(6,I)
                              :REM*15
132Ø A(1Ø,I)=A(9,I)/A(8,I)
                              :REM*223
133Ø I=I+1:LOOP               :REM*51
134Ø FORI=1+PGTO13+PG:FORJ=6TO1
    Ø                         :REM*87
135Ø PRINTTAB(TB(J));:PRINTUSIN
    G"#####";A(J,I);  :REM*191
136Ø NEXTJ:PRINT" ":NEXTI
                              :REM*11
137Ø PRINT"{HOME}{CRSR DN}{CTRL
     9}{COMD 1}"CHR$(143)"{16
    SPACEs}"                  :REM*115
138Ø RETURN                   :REM*163
139Ø :                        :REM*91
14ØØ PRINT"{HOME}{CRSR DN}{COMD
     1}{2 CRSR RTs}"CHR$(15)"{
    SHFT S}EARCHING...{COMD 3}
    "                         :REM*59
141Ø C1=C:R1=R                :REM*77
142Ø FORI=3TO5:FORJ=1+PGTO13+PG
                              :REM*1Ø9
143Ø IFA(I,J)>199THENC=I:R=J-PG
    :GOSUB188Ø                :REM*85
144Ø NEXT:NEXT                :REM*169
145Ø FORJ=1+PGTO13+PG         :REM*161
146Ø IFA(6,J)>499THENC=6:R=J-PG
    :GOSUB188Ø                 :REM*7
147Ø NEXT                     :REM*2Ø5
148Ø C=C1:R=R1                :REM*157
149Ø PRINT"{HOME}{CRSR DN}{CTRL
     9}{COMD 1}"CHR$(143)"{16
    SPACEs}"                  :REM*235
15ØØ RETURN                   :REM*27
151Ø :                        :REM*211
152Ø WINDOW1Ø,1,7Ø,22         :REM*165
153Ø PRINT"{CTRL 9}{CTRL 3}{COM
    D A}{22 SHFT *s}{CTRL 2}{S
    HFT T}ENPIN {SHFT L}EDGER{
    CTRL 3}{23 SHFT *s}{COMD S
    }"                        :REM*157
154Ø PRINT"{CTRL 9}{SHFT -}{58
    CRSR RTs}{SHFT -}" :REM*88
155Ø PRINT"{CTRL 9}{SHFT -}{9 C
    RSR RTs}{CTRL 6}{CTRL Ø}1]
     {SHFT L}OAD {SHFT F}ILE{1
    5 SPACEs}2] {SHFT S}AVE {S
    HFT F}ILE{1Ø SPACEs}{CTRL
    3}{CTRL 9}{SHFT -}"
                              :REM*116
156Ø PRINT"{CTRL 9}{SHFT -}{9 C
    RSR RTs}{CTRL 6}{CTRL Ø}3]
     {SHFT V}IEW/{SHFT M}ODIFY
     {SHFT D}ATA{8 SPACEs}4] {
    SHFT P}RINT {SHFT F}ILE{9
    SPACEs}{CTRL 3}{CTRL 9}{SH
    FT -}"                    :REM*124
157Ø PRINT"{CTRL 9}{SHFT -}{9 C
    RSR RTs}{CTRL 6}{CTRL Ø}5]
     {SHFT V}IEW {SHFT D}ISK {
    SHFT D}IRECTORY{5 SPACEs}6
    ] {SHFT E}XIT{15 SPACEs}{C
    TRL 3}{CTRL 9}{SHFT -}"
                              :REM*194
158Ø PRINT"{CTRL 9}{SHFT -}{58
    CRSR RTs}{SHFT -}":REM*128
159Ø PRINT"{CTRL 9}{CTRL 3}{COM
    D Q}{58 SHFT *s}{COMD W}"
                              :REM*84
16ØØ FORI=1TO1Ø:PRINT"{CTRL 9}{
    SHFT -}{58 CRSR RTs}{SHFT
    -}":NEXT                  :REM*152
161Ø PRINT"{CTRL 9}{CTRL 3}{COM
    D Z}{58 SHFT *s}{COMD X}"
                              :REM*254
162Ø RETURN                   :REM*148
163Ø :                        :REM*76
164Ø R=1:C=1:F$=".TP":PG=Ø:P=1:
```

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TENPIN LEDGER

```
      SC=Ø                    :REM*124
165Ø  FORI=1TO53:D$(I)="Ø1/Ø1":N
      EXT                     :REM*28
166Ø  FORI=1TO1Ø:FORJ=1TO53:A(I,
      J)=Ø:NEXT:NEXT          :REM*42
167Ø  RETURN                  :REM*198
168Ø  :                       :REM*126
169Ø  V$="":K$="":CT=Ø:FL=1:PRIN
      T"{HOME}{CRSR DN}{COMD 1}"
      TAB(12);                :REM*18Ø
17ØØ  SYS52684,192,1Ø         :REM*216
171Ø  GETKEYK$                :REM*66
172Ø  IFK$=CHR$(13)THEN184Ø:REM
      RETURN                  :REM*26
173Ø  IFK$=CHR$(2Ø)ANDCT<>ØTHENP
      RINT"{CRSR LF} {CRSR LF}";
      :CT=CT-1:V$=LEFT$(V$,CT):G
      OTO171Ø                 :REM*76
174Ø  IFK$=" "THEN181Ø:REM SPACE
                              :REM*9Ø
175Ø  IFK$="."THEN181Ø        :REM*174
176Ø  IFTY=1OR TY>2THENIF(K$>"@"
      )AND(K$<"[")THEN181Ø:REM A
      LPHA                    :REM*Ø
177Ø  IFTY>1THENIF(K$>"/")AND(K$
      <":")THEN181Ø:REM NUMERIC
                              :REM*23Ø
178Ø  IFTY=4THENIF(K$>" ")AND(K$
      <"Ø")THEN181Ø:REM !"#$%&'(
      )*+,-./ PUNCTUATION
                              :REM*22Ø
179Ø  IFTY=4THENIF(K$>"9")AND(K$
      <"@")THEN181Ø:REM :;<=>? P
      UNCTUATION              :REM*14
18ØØ  GOTO171Ø                :REM*1Ø1
181Ø  IFCT>=LTHEN171Ø         :REM*35
182Ø  CT=CT+1:V$=V$+K$:PRINT"{CT
      RL 9}"K$;               :REM*191
183Ø  GOTO171Ø                :REM*131
184Ø  IFCT=ØTHENFL=Ø          :REM*37
185Ø  SYS52684,16Ø,1Ø:PRINT"{CTR
      L Ø}";:RETURN           :REM*75
186Ø  :                       :REM*51
187Ø  PRINT"{CTRL 6}";        :REM*193
188Ø  IFC=1THENCHAR1,C+1,R+2,"":
      PRINTUSING"{CTRL Ø}#####";
      D$(R+PG)                :REM*227
189Ø  IFC>1THENCHAR1,(C-1)*8+2,R
      +2,"":PRINTUSING"{CTRL Ø}#
      ####";A(C,R+PG)         :REM*173
19ØØ  RETURN                  :REM*173
191Ø  PRINT"{COMD 7}";        :REM*177
192Ø  IFC=1THENCHAR1,C+1,R+2,"":
      PRINTUSING"{CTRL 9}#####";
      D$(R+PG)                :REM*139
193Ø  IFC>1THENCHAR1,(C-1)*8+2,R
      +2,"":PRINTUSING"{CTRL 9}#
      ####";A(C,R+PG)         :REM*181
194Ø  RETURN                  :REM*213
195Ø  :                       :REM*141
196Ø  PRINT"{2 SPACEs}"CHR$(2)"{
      CRSR DN}{CTRL 5}{SHFT P}RE
      SS ANY KEY TO CONTINUE.";C
      HR$(13Ø)                :REM*11
197Ø  GETKEYK$                :REM*71
198Ø  RETURN                  :REM*253
199Ø  :                       :REM*181
2ØØØ  PRINT"{HOME}{CRSR DN}{CTRL
       9}{COMD 1}{2 CRSR RTs}{SH
      FT A}RE YOU SURE?":REM*1Ø9
2Ø1Ø  GETKEYK$:IFK$<>"Y"THEN2Ø4Ø
                              :REM*65
2Ø2Ø  PRINT"{HOME}{CRSR DN}{COMD
       1}"CHR$(15)"{2 CRSR RTs}{
      SHFT C}REATE NEW FILE..."
                              :REM*65
2Ø3Ø  GOSUB164Ø:SC=Ø          :REM*239
2Ø4Ø  PRINT"{HOME}{CRSR DN}{CTRL
       9}{COMD 1}"CHR$(143)"{2Ø
      SPACEs}"                :REM*245
2Ø5Ø  RETURN                  :REM*68
2Ø6Ø  :                       :REM*252
2Ø7Ø  SYS52684,Ø,12:SYS52684,8,2
      Ø:POKE26Ø6,Ø:POKE26Ø7,8:RE
      TURN:REM SCREEN 1       :REM*4
2Ø8Ø  SYS52684,16,12:SYS52684,24
      ,2Ø:POKE26Ø6,16:POKE26Ø7,2
      4:RETURN:REM SCREEN 2
                              :REM*122
1ØØØØ SCRATCH"TENPIN LEDGER":DS
      AVE"TENPIN LEDGER"
                              :REM*173
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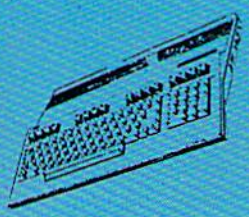

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GEOWATCH

Color your holiday bright with GEOS gifts for your computing friends.

By MATTHEW STERN

What do you give a GEOS user for Christmas or Hanukkah? A geoFruit cake? A menu-driven menorah? Chocolates shaped like deskTop icons? In this month's column, I'll tell you about a variety of useful gifts, many of them costing less than $25, for the GEOS users on your holiday shopping list. There's even a special offer this season on a complete GEOS system.

Software Specials

Nothing would gladden a GEOS user's heart more than finding new software under the tree. Of course, any of Berkeley Softworks' programs would be ideal, but my personal favorites are Writer's Workshop ($50) and Desk Pack 1 ($35). Berkeley products are available at most computer stores, usually at less than the suggested retail price.

You'll find the biggest discount on GEOS products from Activision, Gamestar, Lucasfilm and New World Computing. These companies are offering a bonus book that includes $500 in discounts on software and other merchandise. With one of these coupons, you can get either Font Pack 1, Desk Pack 1, geoDex, geoFile, geoCalc or Writer's Workshop for only $9 with the purchase of GEOS 64 or 128.

For the small children on your list, Mystic Jim presents a collection of educational software called geoKids. The geoKids Volume 1 disk includes two games, called Kindermouse and Simon's Song. Each of these programs offers a choice of skill levels to suit your child's ability.

Kindermouse helps teach numbers, fractions, letters and shapes, with the user clicking on the right answer to the problem at the top of the screen. Simon's Song challenges memory skills by flashing four boxes on the screen and playing a series of notes. The user tries to duplicate the sequence of notes by clicking on the boxes. More notes are added with each turn, so the game gets more stimulating as it goes along.

The geoKids package sells for $12. It's available from Mystic Jim, 2388 Grape, Denver, CO 80207, or you can contact Jim's bulletin board at 303-321-8954.

Mystic Jim is one of a growing number of independent GEOS developers. I'll discuss them further in upcoming columns.

Hardware Delights

For GEOS users who've been especially good this year, you might want to wrap up some new hardware. In my opinion, the Commodore 1351 mouse offers the best control of any GEOS input device. However, if you don't want to part with that much money, or the person on your list doesn't have much desk space, there's another solution—Suncom's IconTroller, a joystick that tapes onto the end of the keyboard.

IconTroller works with GEOS and other joystick-controlled games and programs. Its cord is long enough to plug into either joystick port, and, because of its small handle and conveniently placed button, you can operate it with one hand. The IconTroller uses the joystick driver and responds as well as a full-sized joystick, although not as well as the 1351 mouse.

The handle of the IconTroller is conveniently located so it doesn't interfere with the right side of the keyboard. I had no trouble using my C-128's numeric keypad with it installed. I'd suggest that you still be careful as you type, however, because bumping the IconTroller might cause some errors.

The nicest feature of the IconTroller is its pass-through connector. The set of pins on the other side will accept a dongle (for programs like PaperClip) or even another joystick or mouse.

The unit retails for $20 and is available at most computer dealers. For more information, contact Suncom, 260 Holbrook Drive, Wheeling, IL 60090.

Holiday Reading

GEOS Inside and Out might not be everyone's idea of Yuletide reading, but it is a useful and informative book. Written by the Data Becker group at Abacus, authors of a full line of technical books for most personal computers, *GEOS Inside and Out* includes tips for both novice and advanced users on deskTop, geoPaint, geoWrite and introductory programming. It provides several type-in programs, including some in Basic, and all are well documented.

How to Get the Most Out of GEOS, by Jim Oldfield and Tim Sickbert, is another good introductory book, though more technically oriented. It includes memory and disk maps, as well as a number of utilities written in Basic.

The ultimate GEOS hacker book is *The Official GEOS Programmer's Reference Guide*, written by Berkeley Softworks people themselves. This book lists in machine code the software routines used to run GEOS. It's not for the casual programmer, but developers will find it useful.

For the average user who just wants to learn about GEOS applications, *COMPUTE!'s User's Guide to GEOS*, by Neil J. Salkind, offers comprehensive tutorials on GEOS, geoWrite and geoPaint, plus plenty of helpful tips. It even describes a few undocumented features of GEOS.

While I'm tipping my hat to fellow publications, let me tell you about a new magazine especially for GEOS users. *Geoworld* includes technical articles, tutorials, a monthly column on desktop publishing and some of the most fantastic GEOS artwork I've ever seen. A subscription costs $20 for twelve issues. For more information, contact Geoworld, 38 Santa Ynez St., Santa Barbara, CA 93103.

Stocking Stuffers

A present doesn't have to be fancy and expensive to impress a GEOS user. The following interesting and useful accessories all sell for under $10 and are sure to please.

Diskassist has come up with a new idea for organizing all those boot and work disks lying around on your desk: Why not put them in a rack? Datastak is a stand that sits on your disk drive or tabletop and holds up to 12 disks. The disk sleeves remain in the Datastak, so you won't misplace them. Datastaks are available by mail order for $6.50

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each, plus $2.25 shipping and handling. (There's no shipping charge if you order two or more.) Write to Diskassist at 4909 Daniel Drive, Crystal Lake, IL 60014.

For your GEOS friends with short memories, you'll want to get Leroy's Cheatsheets for GEOS 64 and 128. These sheets list commonly used commands for deskTop, geoPaint and geoWrite, and they sit on top of your computer for easy reference. The GEOS 64 cheatsheet sells for $4, the GEOS 128 sheet for $8. Both are available from Cheatsheet Products, Inc., PO Box 111368, Pittsburgh, PA 15238; 800-334-2896.

You can even give your mouse a present. A mousepad is a smooth, even surface that your mouse will enjoy rolling on and will help keep the mouse ball clean. My favorite mousepad is from Mousetrak, Inc. Its thick padding and cloth surface provide traction for excellent control. I paid only $8 for mine at a dealer. Call Mousetrak, Inc., at 707-963-8179 or 800-221-MOUS.

There are three other gifts I hope everyone gets this year: good health, happiness and peace—and have a pleasant and safe holiday. ■

The geoWatch column addresses RUN *readers who use Berkeley Softworks' GEOS for the C-64 or C-128. Your questions and comments are welcome. Send them to:*

Matthew Stern
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You can also contact Matthew Stern on Q-Link. His online name is Matt S3.

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EASY APPLICATIONS

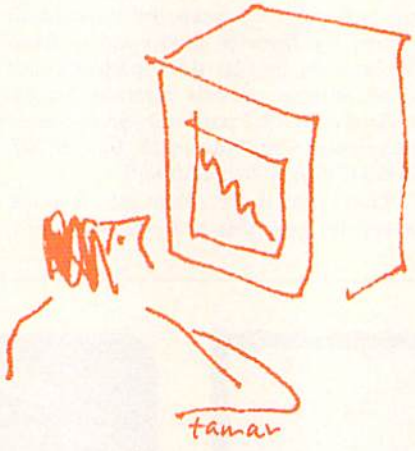
SMART SHOPPER: The REM Sheet program's product-comparison charts help you make wise buying decisions.

By JEROME REUTER

On a scale of one to ten, how do you rate yourself as an intelligent shopper? How often do you find a better product at a lower price right after you've made a purchase? You can prevent such unhappy occurrences by comparing before you buy; that's where REM Sheet can help.

REM Sheet is a Basic program that will print out a comparison-shopping worksheet that you can take with you to the store. The program doesn't care if you're shopping for a new printer, a database, a washing machine or an automobile; and it's versatile, letting you include up to twelve products and twelve comparison categories. Your printer must be a dot matrix machine with graphics keys, such as the Commodore MPS-801, -803, -1000 or -1200, or else a compatible non-Commodore printer.

After typing in Listing 1, save a copy



to disk. When you run the program, it will ask you to enter the number of products and the comparison categories you want, plus an optional title. Then it will produce a printout with the title line, a grading scale and a grid where you check off your findings.

The top of the grid is labeled with the features you entered, and down the left side are lines for you to write in the names of the products. On the right, there's one blank column for penciling in some feature that didn't occur to you until you got to the store, as well as a Totals column for summarizing your findings.

REM Sheet has many other uses besides comparison shopping. I find it handy for listing the months of the year across the top and my monthly bills down the left side. Then I can tell at a glance which bills I've paid and which will soon be due. I'm sure you'll find other uses for REM Sheet, too. R

Jerome Reuter is a retired naval officer who has written all the software he uses in his small contracting business.

Listing 1. REM Sheet program.

```
10 PRINT"{SHFT CLR}{CTRL 9}{CTR
   L 8}{4 SPACEs}REM SHEET - BY
    JEROME E. REUTER{5 SPACEs}"
                        :REM*102
20 POKE 53281,6:POKE 53280,6:F=
   1:MX=10:HD$=""       :REM*38
30 INPUT"{2 CRSR DNs}HOW MANY D
   IFFERENT {CTRL 4}BRANDS{CTRL
    8} ARE YOU GOING TO COMPARE
    ";NB                :REM*22
40 IF NB<1 THEN 30      :REM*22
50 INPUT"{2 CRSR DNs}HOW MANY {
   CTRL 4}FEATURES{CTRL 8} ARE
   YOU GOING TO GRADE (1-13) ";
   NF                   :REM*122
60 IF NF<1 OR NF>13 THEN 50
                        :REM*18
70 DIM AR$(NF+2):AR$(NF+1)="{6
   SPACEs}":AR$(NF+2)="* TOTALS
    *":PRINT:PRINT      :REM*20
80 PRINT"{CTRL 8}FEATURE NUMBER
    ";F;:INPUT"{CTRL 4}";AR$(F)
   :IF F<NF THEN F=F+1:GOTO 80
                        :REM*48
90 PRINT"{2 CRSR DNs}{CTRL 8}FO
   RMATTING THE STRINGS":GOSUB{
   2 SPACEs}500:PRINT"{2 CRSR D
   Ns}DONE"             :REM*34
100 INPUT"{2 CRSR DNs}DO YOU WA
    NT A {CTRL 4}TITLE/HEADER{C
    TRL 8} LINE{4 CRSR RTs}Y{3
    CRSR LFs}";AS$      :REM*180
110 IF AS$<>"Y" THEN 170
                        :REM*196
120 PRINT"{2 CRSR DNs}ENTER YOU
    R {CTRL 4}TITLE/HEADER{CTRL
     8} (30 CHR MAX)"   :REM*158
130 GETA$:IF A$="" THEN 130
                        :REM*198
140 IFA$=CHR$(13) THEN 160
                        :REM*194
150 PRINTA$;:HD$=HD$+A$:GOTO 13
   0                    :REM*142
160 IF LEN(HD$)>30 THEN HD$="":
   GOTO 120             :REM*210
170 PRINT:PRINT"{2 CRSR DNs}HEA
   DER/TITLE IS {CTRL 4}: ";HD
   $                    :REM*0
180 INPUT"{CTRL 8}{2 CRSR DNs}I
   S THIS CORRECT{4 CRSR RTs}Y
   {3 CRSR LFs}";AN$    :REM*104
190 IF AN$<>"Y" THEN HD$="":A$=
   "":GOTO 120          :REM*94
200 INPUT"{2 CRSR DNs}WHAT IS T
   HE PRINTERS DEVICE NUMBER{4
    CRSR RTs}4{3 CRSR LFs}";DN
                        :REM*98
210 OPEN 15,DN,15:CLOSE 15
                        :REM*160
220 IF ST<>0THENPRINT"{2 CRSR D
   Ns}PRINTER DOES NOT RESPOND
    - {CTRL 4}PLEASE CHECK{CTR
   L 8}":GOTO 200       :REM*176 ►
```

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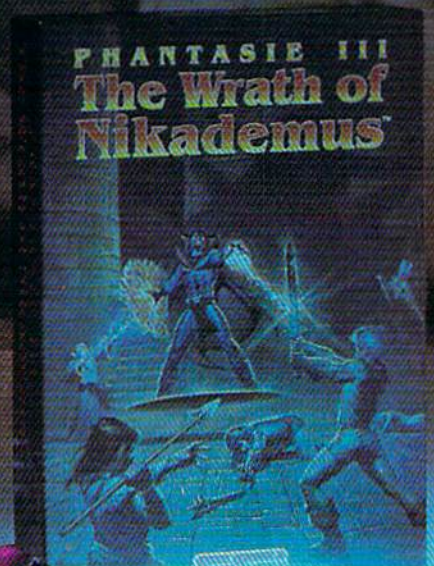

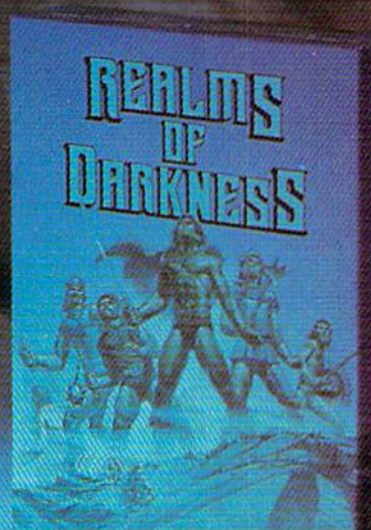

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If there are no convenient stores near you, VISA and M/C holders can order these $39.95 games by calling **toll-free 800-443-0100, x335**. Or send your check to SSI at the address above. (CA residents, add applicable sales tax.) Please specify computer format and add $2.00 for shipping & handling.

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```
23Ø OPEN 1Ø,DN,1Ø:PRINT#1Ø:CLOS
    E1Ø                    :REM*11Ø
24Ø INPUT"{2 CRSR DNs}START {CT
    RL 9}{CTRL 4}P{CTRL 8}{CTRL
     Ø}RINTING OR START {CTRL 9
    }{CTRL 4}O{CTRL 8}{CTRL Ø}V
    ER{CTRL 4}{4 CRSR RTs}{CTRL
     9}P{CTRL Ø}{3 CRSR LFs}{CT
    RL 8}";AN$             :REM*9Ø
25Ø IF AN$="O" THEN RUN:REM*222
26Ø OPEN4,DN:PRINT#4,CHR$(14):X
    =INT(4Ø-(LEN(HD$)*2)/2)
                           :REM*253
27Ø PRINT#4,SPC(X/2);:PRINT#4,H
    D$                     :REM*163
28Ø PRINT#4,SPC(X/2);:FOR X=1 T
    O LEN(HD$):PRINT#4,"{COMD U
    }";:NEXT               :REM*135
29Ø PRINT#4,CHR$(15):PRINT#4:PR
    INT#4                  :REM*131
3ØØ PRINT#4,"{2 SPACEs}.{3 SPAC
    Es}1{3 SPACEs}.{3 SPACEs}2{
    3 SPACEs}.{3 SPACEs}3{3 SPA
    CEs}.{3 SPACEs}4{3 SPACEs}.
    {3 SPACEs}5{3 SPACEs}.{3 SP
    ACEs}6";               :REM*245
31Ø PRINT#4,"{3 SPACEs}.{3 SPAC
    Es}7{3 SPACEs}.{3 SPACEs}8{
    3 SPACEs}.{3 SPACEs}9{3 SPA
    CEs}.{3 SPACEs}1Ø" :REM*251
32Ø FOR X=1 TO 8Ø:PRINT#4,"{SHF
    T +}";:NEXT            :REM*17
33Ø PRINT#4,"{SHFT Z}POOR{SHFT
    Z} ","{SHFT Z}FAIR{SHFT Z}
    "," {SHFT Z}AVERAGE{SHFT Z}
    ","{2 SPACEs}{SHFT Z}GOOD{S
    HFT Z}","{2 SPACEs}{SHFT Z}
    BEST{SHFT Z}"          :REM*59
34Ø PRINT#4:PRINT#4:PRINT#4,CHR
    $(14):OPEN6,4,6:PRINT#6,CHR
    $(25):CLOSE 6          :REM*143
35Ø FOR Y=1 TO MX          :REM*169
36Ø PRINT#4,SPC(9);:FORF=1 TO N
    F+2:PRINT#4," "+MID$(AR$(F)
    ,Y,1);:NEXT F:PRINT#4
                           :REM*241
37Ø NEXT Y:OPEN6,4,6:PRINT#6,CH
    R$(21):CLOSE6          :REM*217
38Ø FOR Y=1 TO NB          :REM*51
39Ø PRINT#4,"{9 COMD Ts}";:FOR
    X=1 TO NF+2:PRINT#4,"{SHFT
    O}{COMD T}";:NEXT X:PRINT#4
    ,"{COMD G}"            :REM*13
4ØØ PRINT#4,SPC(9);:FOR X=1 TO
    NF+2:PRINT#4,"{COMD G} ";:N
    EXT X:PRINT#4,"{COMD G}"
                           :REM*93
41Ø NEXT Y                 :REM*111
42Ø PRINT#4,"{9 COMD Ts}";:FOR
    X=1 TO NF+2:PRINT#4,"{2 COM
    D Ts}";:NEXT X         :REM*129
43Ø OPEN1Ø,DN,1Ø:PRINT#1Ø:CLOSE
    1Ø:PRINT#4:CLOSE4      :REM*43
44Ø INPUT"{2 CRSR DNs}PRINT ANO
    THER{4 CRSR RTs}Y{3 CRSR LF
    s}";AN$                :REM*187
45Ø IF AN$<>"Y"THEN 49Ø :REM*57
46Ø INPUT"{2 CRSR DNs}SAME INFO
    RMATION{4 CRSR RTs}Y{3 CRSR
     LFs}";AN$             :REM*181
47Ø IF AN$="Y"THEN 21Ø  :REM*29
48Ø RUN                    :REM*11
49Ø PRINT"{SHFT CLR}":END
                           :REM*175
5ØØ FOR F=1 TO NF+2        :REM*53
51Ø IF LEN(AR$(F))>MX THEN MX=L
    EN(AR$(F))             :REM*197
52Ø NEXT                   :REM*2Ø
53Ø FOR F=1 TO NF+2        :REM*84
54Ø IF LEN(AR$(F))<MX THEN AR$(
    F)=" "+AR$(F)          :REM*7Ø
55Ø IF LEN(AR$(F))<>MX THEN 54Ø
                           :REM*188
56Ø NEXT:RETURN        :REM*246 ■
```


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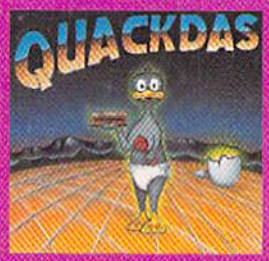

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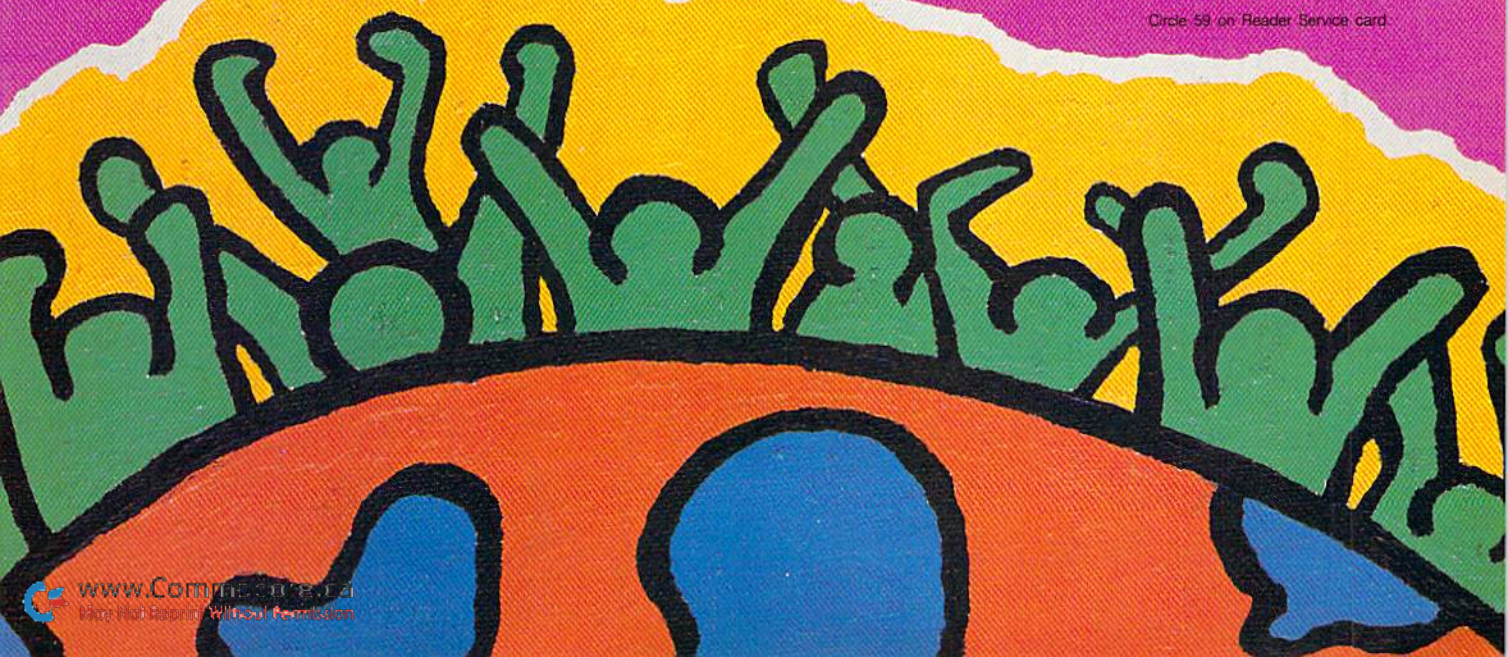

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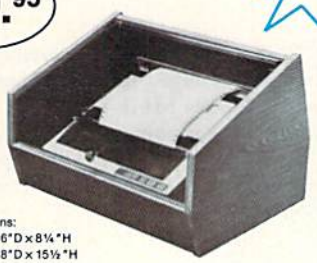

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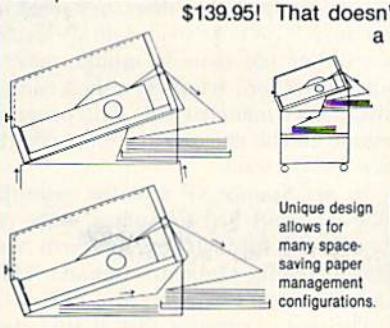

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TELECOMPUTING WORKSHOP

Discover a new bulletin board program that will make setting up your BBS easy and inexpensive.

By DAVID BRADLEY

Before I get started, I'd like to send holiday wishes to all my *RUN* readers. I hope Santa brings each and every one of you a 1200-baud modem and a disk full of great terminal programs for your computer.

Recently a friend of mine, Phelps Goodman, called from Toronto. After we exchanged pleasantries, he told me what he had to go through to get my new phone number in Florida. First he called information, but the number they gave him was 813-377-5941, my BBS number, so when he called, he got my modem. Then he called my brother and his wife, but they were unable to help, because they have my voice number programmed into their telephone; they just press the button with my name beside it. Finally, he got hold of my father, who has my number written down in a phone book. Imagine that—written down!

The reason I mention this story is to urge people who have phones that store numbers, or who use terminal programs to store phone numbers and passwords, to have a backup system of some sort. If you have a phone that stores numbers, write those numbers down somewhere. If your terminal program keeps your numbers and passwords, then have a backup copy or a printout somewhere safe. If you opt for a printout, be sure it's where you know about it, but not where somebody else could come across it and start calling BBSs and networks in your name. Besides possibly costing you money, this could be a major embarrassment.

Now on to some questions.

Q *I have a VIC-20 and a VIC Modem. How can I swap programs with an Apple IIe?*

—CHRIS YOUNG
OZARK, AL

A If you have a disk drive and a terminal program for the VIC that supports the Xmodem transfer protocol, and the person with the Apple has a modem and a terminal program that supports Xmodem, you should be able to transfer text files. However, keep in mind that programs you receive won't run on the VIC-20.

Q *I'd like to know how I can get an updated version of the C-Net BBS program?*

—BILL DRISCOLL
CONNELSVILLE, PA

A Contact SofTech Enterprises, PO Box 23397, Lexington, KY 40523; 606-268-2283. They sell C-Net.

Q *I've been into telecommunications for about four years. I enjoy QuantumLink and the bulletin boards in my area, but now I'm interested in running my own BBS. How do I get started, and where can I get a BBS program? I have a C-64 and a Commodore 1650 modem.*

—RYAN SETTER
EAGAN, MN

A I've recently come across an excellent bulletin board program for the C-64 and the Commodore 1650 and 1670 and Mitey Mo modems. It's called Spence-XP BBS and was written by Ken Spence and James MacFarlane of Toronto. These two young programmers also made use of some fast garbage-collection routines for the C-64 by David Williams. The program is copyrighted, but it can be copied for nonprofit purposes.

The authors have written and published an 18-page manual they sell for $10. Besides the manual, you'll get the latest version of the BBS program, and you'll be informed of updates.

Spence-XP doesn't have as many features as some BBS programs, but it's easy to set up, run and maintain, and it's flexible. It can run a BBS effectively on a C-64 and a 1541, and it can handle a mega-BBS on many disk drives just as easily. I'm currently using this program to run my BBS.

Spence-XP offers uploading using Punter protocol, downloading using the Punter and Xmodem protocols, bulletins and electronic mail, with one of the most innovative message-editing systems I've seen in a long time. On many systems, once you press return, you can't go back and edit text previously entered without leaving the text-entry section.

With this program, a back-arrow is displayed when you hit return, but you stay on the same line of the text editor. If you see a mistake or decide you want to rewrite something, you just back up over any or all of the back-arrows and make your changes.

Spence-XP is written in Basic, with machine language subroutines for input/output and garbage collection. This means that, if you know Basic, you can tailor the program to your specifications. When you order the program, you'll get a compiled (using the Blitz! compiler) version, as well as the Basic source code.

The hassle of setting up a BBS sometimes turns potential SYSOPS off. You usually have to spend many hours figuring out the set-up programs, and they ask a lot more questions than they need to. Spence-XP isn't like that at all. My system was online less than 30 minutes after I got the program. It hasn't crashed, eaten a disk or even mangled a file. This program is good and it's cheap. What more could a new SYSOP want?

To get Spence-XP and the essential manual, send $10 to Spence BBS, c/o Context Publishing, 3092 Danforth Ave., Scarborough, Ontario, Canada M1L 1B1. You won't be sorry you did!

The cost of running this or any other BBS is the cost of the equipment on the system, any repairs that are required, the program, some blank disks for backups, the phone line, electricity and the time it takes to maintain the system.

If you have all the equipment, you could probably get the Spence system up and running for under $100, including the cost of installing a dedicated telephone line. Such a line doesn't have to be a special data line; just call your local telephone company and order a

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new line just as you would order a voice line. After installation, the dedicated line might cost $20–$30 a month to maintain.

As a little side note, one thing no BBS should lack is at least one fan to keep everything running cool. A small fan can preserve your disk drive(s), power supply and sanity on a hot day.

Q *I have a C-64, a 1571 disk drive and a 1525 printer, and now I want to purchase a modem. I'm interested mainly in downloading video games from BBSs, but my dad is concerned about the cost of the phone calls. We're in a rural area, so all calls would be long distance.*

—J. R. ROBERTS
POMERENS, AZ

A I can understand your father's concern about the long-distance calls; modem calls cost just as much as voice calls. If you're going to get a modem, be sure it's 1200-baud, because it'll download four times faster than 300 baud. A good Commodore-specific and Hayes-compatible modem that runs at both 300 and 1200 baud is the TCM-1200 from Trans Com, Inc., 703-13 Annoreno Drive, Addison, IL 60101; 312-543-9055. The TCM-1200 costs $139.95.

Another solution might be to get in touch with public domain software sources and order disks from them. Many clubs and other organizations offer their disks this way, and you won't get stuck with a phone bill the size of the national debt! Of course, you won't get much telecomputing experience either, but you'll probably get better value for your money (a disk of programs from such organizations usually costs less than $10), and you'll be supporting the computer industry instead of the telephone company.

Q *I have a C-64, a Commodore 1660 300-baud modem and the Common Sense terminal program. Almost every time I try to call a BBS, the modem connects, but all I get on the screen is the word "Connect"; nothing else happens. I'm sure the modem is still connected with the BBS, because when I pick up the phone, I hear a high-pitched tone.*

Whenever I boot up Common Sense, I get a lot of garble on the screen. I looked in the troubleshooting section of the manual, but all it says is to make sure I have the modem connected right. When I check, it seems to be fine, but I still get the garble on the screen.

Finally, whenever I try to call a BBS using touch-tone dialing, the modem waits a long time and then rings twice. On the second ring, I get a recording telling me to hang up and try again. My phone line supports touch-tone and pulse dialing.

—BYRON HENDERSON
WILMINGTON, DE

A When you make a connection, but nothing happens, try hitting the return key a few times. That's necessary with a lot of BBSs.

If it still won't work, don't blame yourself. Although Common Sense is a powerful program, it's also confusing. A lot of new 1660/1670 owners have returned their modem to the store as defective, because they couldn't get Common Sense to work.

Before you give up on telecomputing, try some other programs—maybe public domain or shareware. A good shareware program that supports the 1660 (as well as many other modems) is called Multi-Term. It should be available from your local user's group, Q-Link or other public domain software source. ■

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COMMODORE CLINIC

This month you'll learn where to find screen-dump buttons and port-extender cables, what to do with an overheated keyboard and how to convert disk files to tape.

By JIM STRASMA

HARDWARE

Q *I recently purchased an Okimate 20 printer, and it's using up a ribbon cartridge every two weeks, at about $5 per cartridge. Is there any better alternative?*

—KEN CHERRY
SPRING GROVE, PA

A You've discovered the Achilles' heel of thermal and thermal transfer printers. Despite very attractive purchase prices and printouts, the cost of supplies for them is usually quite high compared to other kinds of printers.

You might, however, be able to lower your ribbon costs somewhat by changing your supplier or buying in bulk. One friend reports good success using Pelican-brand ribbons. Another reputable supplier, Quill Corporation (100 S. Schelter Rd., Lincolnshire, IL 60197) recently offered ribbons for the Okimate 20 at $3.58 each.

Q *My Commodore DPS 1101 daisy wheel printer works great, but it needs a tractor feed. Can one be purchased anywhere?*

—JIM WERRE
SAN JOSE, CA

A Essentially, the 1101 was a Juki printer under the skin, a model 6100 if I recall correctly. Since a tractor feed has definitely been available for the Juki, you should be able to use the same one on your 1101. Lyco Computers (800-233-8760) offered the Juki 6100 in a recent issue of *RUN*, so you might ask them about a tractor feed.

Q *Is there a product with a push-button screen dump that prints out any screen from a C-128 and C-64?*

—JOHN KIMBALL
WASHINGTON, DC

A I haven't heard of one that will handle the C-128's 80-column screen yet, but if you can live with a C-64-mode dump, either of two products should work well for you. One is the Freeze Frame cartridge, now sold by Supra (1133 Commercial Way, Albany OR 97321), since its original maker, Cardco, folded. The other is The Final Cartridge, from H&P (154 Valley St., South Orange, NJ 07079). Since I don't like to constantly plug cartridges in and pull them out, my own preference would be for The Final Cartridge, due to its many other features, including a program freezer, RAM dump, fast loader, machine language monitor, and more.

Q *I have a space problem behind my computer, so I'd like to use a ribbon cable to connect a multiple expansion module to the expansion port on my Commodore. Is it possible?*

—H. FELBER
FORT MYERS, FL

A Yes. Such cables are now available from at least two sources. Aprotek (1071-A Avenida Acaso, Camarillo, CA 93010) offers a ten-inch ribbon extender for about $23 postpaid, and Value Soft (3641 SW Evelyn St., Portland, OR 97219) has one that's 12 inches long for the same price.

Another reader asked the same question about extending the user port with a ribbon cable. That cable, too, is offered by Aprotek.

Q *How can I hook up more than one monitor to my C-128?*

—JASON MARINER
ALBUQUERQUE, NM

A Being able to hook up two monitors at once is one of the C-128's nicer features. It was part of Commodore's original demonstrations when they first released that computer.

Simply connect one monitor to the composite video port (the one with an 8-pin DIN plug) and the other to the RGB port (the one with a 9-pin subminiature D connector). Naturally, the one connected to the composite port needs to be a composite monitor, such as Commodore's 1702, while you'll need an RGB monitor for the RGB port, such as an IBM color graphics display. Or you can plug both connectors into Commodore's 1902A monitor, then use it in both modes alternately by selecting RGB or Composite from a switch on the front of the monitor.

REPAIR

Q *I've had my C-64 for about four years. Now it's giving the wrong results when I press keys after the computer has been on for about 1¼ hours. Specifically, it types 2 when I press 8, and q when I press u. What can be wrong?*

—FRANK FLAHERTY
E. STROUDSBURG, PA

A Since the problem occurs only when the unit has heated up, and you get faulty results from those keys rather than no results at all, the prime suspect is one of the 128's 6526 CIA chips that controls the keyboard. A short in the keyboard cable is also a possibility, but unlikely unless you've opened up your computer case many times.

The 6526 chip to replace is at location U1 on the main circuit board. A common cause of failure is from a short or spark caused while plugging or unplugging a joystick or modem. Unfortunately, the chip is usually soldered in place. Unless you're skilled with a desoldering iron, you'll need a repair shop to do the actual work. Just be sure the new chip is socketed, in case the problem recurs.

PROGRAMMING

Q *In the directories of some commercial disks, the word DEL appears in the file-type column. Similarly, sometimes when I download a combined file from the local BBS and separate it afterwards with a program called Lynx, one program doesn't work, and, when listed, it has a DEL* ►

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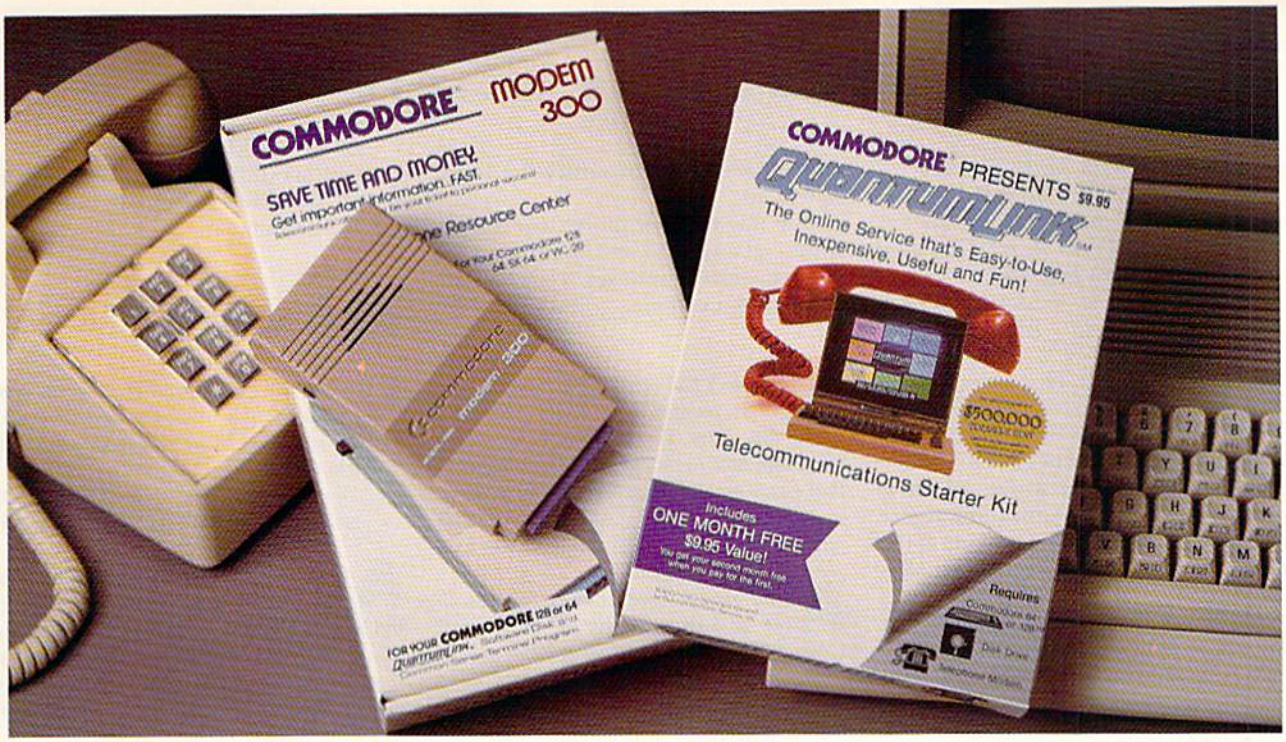

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inserted after its name in the directory.

Does DEL there mean deleted? If so, why doesn't it just not show up in the directory at all? And if that's not its meaning, what can I do to save such programs?

—ALASTAIR BOR
ANDOVER, MA

A The delete file type does indeed seem to stand for deleted. More specifically, it stands for a file that has been scratched, but not closed. It's definitely a file type to avoid, which is presumably the precise meaning you're intended to receive when looking at the directory of a copy-protected commercial disk.

Altering a directory entry so that it will show as a delete file is a simple matter of altering the file-type byte in the directory entry to the hex value $80, using any of the readily available disk sector editors. However, if you change the file-type byte back to that of a normal file (for example, to $82 for a program file or $81 for a sequential file), be aware that the associated file may still be incorrect—either intentionally as a part of a copy-protection scheme or accidentally as a result of an unsuccessful disk command.

The best thing to do with such files on a disk that's copy-protected is to leave them alone, so as not to disturb the already fragile functioning of such disks. If a delete file shows up on other disks, I'd consider that a good time to copy all their other files one at a time onto another disk for safe-keeping, then restore the deleted file on the new disk from the most recent backup. (You do make backups of your data disks, don't you?)

Q *I don't understand the meaning of the double question marks (??) I get on my monitor screen.*

—SAMUEL MARTINEZ
NEW YORK, NY

A The only time I'd expect you to see double question marks on a Commodore is when responding to an Input statement when running a Basic program. Normally, the Input statement displays only one question mark, indicating that the computer is awaiting your response. However, it's possible for the Input statement to ask for more than one response at a time, and also possible for you to give fewer responses than it wants before pressing the return key.

In such cases the computer will put two question marks at the start of a new line on the screen, then wait for further input from you until you've entered enough responses to satisfy the Input statement.

One way to enter more than one response at a time to an Input statement is to separate responses from one another with a comma.

Q *I haven't had any benefit from the programs published in* RUN *because I have a tape drive. Would you be kind enough to explain how to change Open statements so that I can use programs written for a disk.*

—JACK SCHULZ
PORT HUENEME, CA

A The Open statement is very flexible and can usually be redirected from a disk to a tape with only a few changes, as long as the program you're altering uses only sequential files. Fortunately, most files are sequential.

Here are the typical changes needed, with explanations:

Disk sequential file Open to write data to drive 0 of disk unit 8:

```
OPEN 7,8,9,"0:KEEPIT,S,W"
```

The equivalent Tape File command is:

```
OPEN 7,1,1,"KEEPIT"
```

which likewise opens file 7 to write a file named KEEPIT, but on the cassette.

The first 1 in the Tape command is the device number of the cassette and replaces device number 8 in the Disk command. The second 1 in the Tape command indicates that the file is open for writing and replaces the ,W at the end of the Disk command. There are no cassette parallels for the channel number 9 in the Disk command, nor for the ,S Disk Access mode, because the cassette has only one possibility for each.

The equivalent commands when reopening an existing file to read back its data are:

```
OPEN 7,8,9,"0:KEEPIT,S,R"
```

and

```
OPEN 7,1,0,"KEEPIT"
```

Note that the only part that changes in either command is the Access mode: ,W became ,R on the disk, and the second 1 became a 0 on the cassette.

You'll also need to turn into a REM statement any lines that check for disk errors or give commands to the disk, but these are usually easily identified by their use of file 15. This is because the Disk-command channel is normally opened with the command OPEN 15,8,15, causing all other disk commands and error checks to also use file 15, even though only the second 15 in the command is essential and the command file may occasionally use a different file number.

SOFTWARE

Q *Can you recommend a program that makes double-sided, double-density disk backups on a C-128 in 128 mode with only a single 1571?*

—JACK KARI
WHITE PIGEON, MI

A One of the best programs for the purpose is free: Multi-file Copier by Kevin Pickell. It's widely available from user's groups, on CompuServe or, if you can't find it elsewhere, from the computer bulletin board system at 217-356-8056.

Q *I'm interested in setting up a modem bulletin board service. I have a C-128 and 1571 disk drive. What else would I need?*

—TOM CARVALHO
SAN DIEGO, CA

A I'm partial to Steve Punter's Punter BBS, one of the first such boards available for Commodore owners and still one of the best known. The current version is 64.5. You can sample his product and arrange a purchase by calling Punter's own BBS in Missassauga, Ontario, Canada. The number is 416-896-1446 (evenings only). You can write Steve Punter at 4342 Forest Fire Lane, Mississauga, Ontario, Canada L4W 3P4.

As for a modem, the Commodore 1670 is probably an adequate and economical choice, although you may want to get Punter's own advice on the best modem to use with his BBS program.

Q *I use a C-128 at home, and my school has a DEC VAX 11/780 and a VT 102 terminal. Is it possible to call the computer at my school to access its files and use my 128 to edit, compile and run them just like the terminal at school? If I need a particular terminal program, could you please recommend one?*

—SCOTT MCCARTHY
LAWRENCE, MA

A I expect the best terminal emulator for your purpose will be Pro Term 128, from King Microware of Montreal, Quebec, Canada. It includes VT 52 and VT 100 emulation.

On the other hand, you can have sur- ►

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prisingly good results with remotely controlling a terminal-oriented computer like the VAX from even the simplest telecommunications programs. Almost any such program can use a line editor to write a program remotely, then give the needed commands to compile and run the resulting programs. As long as the results are directed to a local printer connected to the VAX, there's no reason anyone need ever know that you wrote the program on a micro.

The main reason for seeking a good terminal emulator is to take advantage of the screen-formatting features of the better terminals, without which screen-oriented programs like the VI full screen editor on the VAX can create displays that look like utter garbage.

Q *I've seen Word Books and Baker Book House named as Christian education software resources. Where are those companies located?*

—JO ANNE BOWEN
LUDLOW, MA

A Word Books is located in Waco, Texas (giving it the popular nickname "Word from Waco"). Baker Book House is located in Grand Rapids, Michigan. Any religious-book seller should be familiar with both of these firms and be able to order their products for you.

OTHER

Q *My Panasonic KX-PRO80 printer is interfaced via the Xetec Super Graphix interface, which gets its power from the cassette port on my computer. I have some game programs that use a dongle (copy-protection hardware) in the same port. The games have a scorecard printout feature, but it doesn't seem to work.*

Short of getting a printer interface that doesn't draw power from the cassette port, what can I do to use the printout feature?

—RICHARD WIGHTMAN
WELLSVILLE, NY

A It sounds like you may be using some programs from Access Software. If so, a friend of mine has used them successfully with the same interface and printer, so they aren't the problem. I suspect you may need to change the mode setting on your Super Graphix, to the 1525 Emulate mode. It's also barely possible that you've managed to plug the power connector into the interface upside down, but in that case your printer wouldn't work at all unless the interface were also getting power via the parallel cable to the printer. ■

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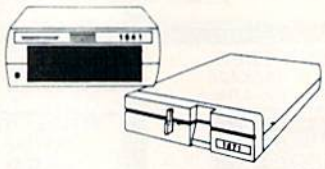

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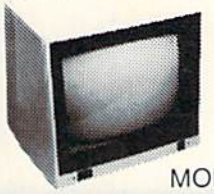

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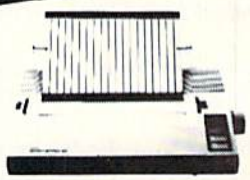

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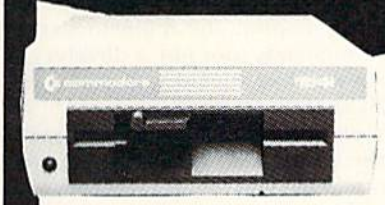

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Compiled by BETH S. JALA

SUPER SNAPSHOT ..... B+

All Those Utilities Packed Into One Cartridge

Super Snapshot (version 2.0+) packs a lot of power into a peripheral that's the size of a standard C-64 cartridge. (The "+" on the 2.0 version is just a fast loader for 1581 disk drive owners.) It enhances the C-64 by adding a Turbo Disk fast loader and formatter, an improved DOS Wedge, programmable function keys, ML Monitor, Screen Copy and Snapshot Archiver. The documentation and overall design of the cartridge indicate a varied target audience—from beginning to advanced users.

A single button gives you access to a system reset and pop-up menu windows. A reset is performed whenever you press the Commodore key and the cartridge button together. An optional switch (add $5) lets C-128 owners leave the cartridge installed while using 128 mode or CP/M, since the Super Snapshot's features only work in 64 mode.

Internally, the cartridge contains nearly 40K of ROM and 8K of RAM. It's the 8K that gives the Super Snapshot its power and edge over other products.

Super Snapshot's Turbo Disk provides a means of fast loading program files on the 1541, 1571 and 1581 without blanking the screen. Furthermore, the routine is intelligent: It reverts to the normal slow load on drives, like the MSD, that are not compatible with the Turbo fast loader. Compared to other fast loaders that damage disks or crash the computer when used with non-fast load-compatible drives, this is a great improvement. I was able to use my MSD and 1541 together with no problems, but the MSD seemed unaffected by the Turbo Disk, whereas the 1541 loaded very fast.

Via the DOS Wedge, the Turbo Disk also gives you a high-speed, 30-second disk format. In other words, with the new command—@FN0:DISKNAME, ID—a disk is formatted and verified in 30 seconds.

The Turbo Disk's DOS Wedge also provides a means of accessing the disk drive in a more user-friendly manner. One key sends all the standard DOS commands plus a variety of others, including: listing the directory to screen, one-key program loads, boot first program on disk and the fast formatter mentioned above.

The Wedge also lets you program the function keys to whatever definition you'd like. Another plus is the fact that the function key definitions use the internal RAM of the cartridge. This means that precious C-64 RAM memory is saved for other uses.

The Code Inspector is the Super Snapshot's resident ML monitor for the C-64. Like the programmable function keys, the ML monitor remains transparent to the computer. By entering the ML monitor, using the control/Snapshot button combination, you can halt a program's execution, resume the program where you left off and select option 5 on the Snapshot pop-up menu.

During the time you are in the ML monitor, you have the ability to alter the program. Upon continuing, your changes will be intact and executable as if they were a part of the original program. Skilled programmers can use the ML monitor to alter games so that participants can have multiple "lives," play longer games and raise scores.

The monitor commands include a simple track and sector editor that lets you load a disk sector into memory, modify it and rewrite it to disk. An enhanced load command displays the beginning and ending addresses of a program in memory.

However, the ML monitor does lack some vital features, some of which are promised by the manufacturer in future updates. I found this to be the only area where the Super Snapshot needs improvement. I'd like to see a complete disk drive monitor, the ability to access DOS commands (not just a directory), smooth-scrolling memory dumps and an ASCII Hunt feature.

Screen Copy, another aspect of Super Snapshot, is a powerful screen dump utility that lets you dump a screen from a program executing in memory to the printer or disk drive.

The printer dump option supports three picture sizes (small, medium, large); five printers (Commodore 1525, 1526, 801, 802, Epson); and a Reverse mode. However, the manual fails to explain the Reverse mode in detail, and it appears to be a trial-and-error type of option.

Surprisingly, the resolution of these printer dumps in all three formats— ►

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text, hi-res and multicolor screen—are of exceptional quality. Furthermore, the program automatically tells you which mode is active and how many sprites are turned on. Although Super Snapshot lacks the ability to print sprites, it handles custom character sets and other hard-to-print images just fine.

Performing a Screen Copy printer dump lets the C-128's CPU run at two different speeds. By toggling the CPU speed up from 1 MHz to 2 MHz, printing speed can be considerably increased.

The Screen Copy's save-to-disk option lets you save a picture in a format compatible with the Doodle! and Koala-Paint programs. You can then load the screen into the appropriate art program for further alterations.

An important point to note is that you can easily update Super Snapshot via its socketed ROM. Simply unplug the old chip and plug in a new one. An upgrade costs $20, which covers the cartridge upgrade, parameter disk and postage.

Another point I'd like to pass along is one of the most important uses I've found for Super Snapshot—Quantum-Link compatibility. As every Q-Link user knows, the Q-Link software doesn't support any type of disk access (formatting, directories, and so forth), which can be particularly irksome when you up- and download as much as I do. Super Snapshot lets you push a button and execute all the disk commands needed, and then go back to the Q-Link software without going off line! However, before executing any disk commands, be sure to *remove* your Q-Link disk so that it's not damaged.

Ever since the day I received this cartridge, it hasn't left my computer's expansion port. I've found it useful, a lot of fun and a great boredom killer. *(Computer Mart, 2700 NE Andresen Rd., Vancouver, WA 98661. $54.95.)*

—DAVID MARTIN
SEABROOK, TX

RARITAN D540 DISK DRIVE ..... A

Slim, Trim and Commodore-Compatible!

If the engineers at Commodore ever want to redesign the venerable 1541 disk drive, they'd best look closely at the Raritan D540. This low profile 1541 clone offers a faithful emulation of the Commodore disk operating system.

Based on what appears to be a standard half-height drive, the Raritan D540 features a sturdy cast aluminum frame and an all-metal enclosure. Of more rugged construction than the 1541, Raritan's D540 also manages to be almost 70 percent smaller than its progenitor. Occupying a scant ten-and-one-half by six inches of desk space, this diminutive drive is only one-and-three-quarter inches high. Two units stacked together occupy less space than a single 1541.

The compact size is achieved by judicious use of space within the enclosure and through the use of an external power supply. With the major heat-producing components eliminated, the D540 can be installed in tight quarters or stacked without fear of overheating.

Sounds interesting, but can it replace the original? At a time when new alternatives to the 1541 seem to be popping up as fast as dandelions in a spring lawn, the question of just how well the D540 emulates the 1541 is the first one that must be answered.

The problem, of course, is protected software. Copy-protection schemes change more often than the weather in New England. Some publishers rely heavily on obscure quirks in the 1541's disk operating system and memory locations within the drive to detect and foil pirated software.

In order to perfectly emulate the 1541, a manufacturer would have to duplicate Commodore's copyrighted operating system. Because that's illegal, the trick is to come as close as possible without infringing on CBM's patents, which is no small feat. Despite ownership of the rights, even Commodore's 1571 drive, in 1541 mode, isn't compatible with all versions of some software written for the C-64. The only way to find out how well the Raritan D540 emulates the 1541 was with a marathon software loading test.

The results were fairly impressive. GEOS 1.3 booted and ran with no difficulty, as did Raid Over Moscow and almost every piece of commercial software I tried. A few programs from Electronic Arts—Racing Destruction Set and Realm of Impossibility—failed to run, but other E.A. programs ran fine.

Time trials established that load times were identical for the D540 and my trusty 1541. The Raritan unit also worked well with an Epyx Fast Load cartridge connected to my C-64.

The D540 passed its other tests with flying colors as well. The direct drive motor spun precisely at 300 rpm. Alignment and track read tests produced results matching the specifications for a 1541. Connected to a C-128, the D540 loaded and ran CP/M flawlessly.

Satisfied that the D540 will run just about any software, I took a closer look at the unit itself. A single LED on the front of the disk drive changes from green to red when it is reading or writing. A DIN power connector, on-off switch and two serial connectors are on the back panel. Dip switches to change the device number (8–11) are easily accessible through a small opening in the bottom of the case.

Commodore's 1541 drive is celebrated for its ability to knock the head out of alignment by hammering it against a stop when formatting a disk or encountering a read error. The Raritan, ever consistent with the original, slams its head, too. However, judging by the appearance of the stepper motor cam and head assembly, this unit isn't likely to need frequent re-alignment. The head stop, a hardened metal plate, should be easy to adjust if necessary.

The disk locking lever, redesigned since I experienced problems with the pre-production unit I first tested, has a more positive feel and latching action than the 1541 with which it was compared.

An easy-to-remove cover (six screws) makes it simple to inspect the D540's innards. Sliding the entire unit from its metal case reveals a compact layout that nevertheless allows easy access to all mechanical components without further disassembly. It was nice to note that both 6522 chips, the 6502 processor and the DOS EPROM are socketed for ease of replacement.

The external power supply, a black box similar to the power unit supplied with Commodore's new 1581 drive, provides standard computer voltages of +5 and +12 VDC. A 220-volt supply is available for use overseas. While the instructions don't mention it, users should also take care to locate the power pack where air can circulate.

After using the D540 for several weeks, I've come to the conclusion that, with a six-month warranty, it's a safe investment. Unless you're heavily into games and don't want to run the risk that one or two deviously protected programs might not load, the Raritan D540 should be an excellent complement to your C-64 or C-128. If you purchase a D540 to expand your system, don't be surprised if this tiny clone quickly becomes your primary drive. *(Raritan Computer, Inc., Building 8, Unit 3, Ilene Court, Belle Mead, NJ 08502. $199.)*

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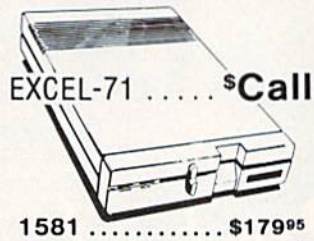

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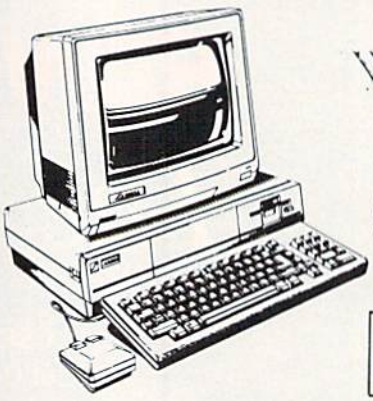

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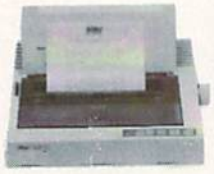

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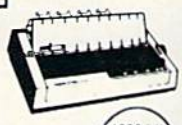

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SIZZLE!

From p. 46.

```
143Ø FORI=1TOLN          :REM*219
144Ø PRINT"{CRSR DN}";   :REM*65
145Ø NEXT                :REM*185
146Ø PRINTTAB(1)"->";:RETURN
                         :REM*189
147Ø GOSUB148Ø:PRINT"<F1> = MAI
     N MENU.";:RETURN    :REM*197
148Ø PRINT"{HOME}{24 CRSR DNs}"
     SPC(12);:RETURN     :REM*39
149Ø GOSUB148Ø:PRINT"{25 SPACEs
     }{HOME}";:RETURN    :REM*99
15ØØ PRINT"{HOME}{CRSR DN}{COMD
      A}{2Ø SHFT *s}{COMD S}"
                         :REM*23
151Ø FORI=1TO2Ø          :REM*1
152Ø PRINT"{SHFT -}"TAB(21)"{SH
     FT -}"              :REM*173
153Ø NEXT:PRINT"{COMD Z}{2Ø SHF
     T *s}{COMD X}":RETURN
                         :REM*199
154Ø J=Ø                 :REM*2Ø6
155Ø FORI=169TO184       :REM*1Ø4
156Ø J=J+1               :REM*36
157Ø T$=MID$(N2$,J,1)    :REM*2
158Ø IFT$=""THENT$=CHR$(16Ø)
                         :REM*22
159Ø B(I)=ASC(T$)        :REM*252
16ØØ NEXT                :REM*8Ø
161Ø B(I)=LEN(N2$):RETURN
                         :REM*16
162Ø PRINT"{SHFT CLR}":GOSUB147
     Ø:PRINT"{HOME}{8 CRSR DNs}
      DO YOU WANT THE FAST-LOAD
     ER DISABLED"        :REM*224
163Ø PRINT"{CRSR DN}AFTER LOADI
     NG A SINGLE PROGRAM (Y/N)?
      ";                 :REM*24
164Ø GOSUB252Ø           :REM*22Ø
165Ø IFKEY$="Y"THENA(84)=1:GOTO
     169Ø                :REM*254
166Ø IFKEY$="N"THENA(84)=Ø:GOTO
     169Ø                :REM*238
167Ø IFKEY$="{FUNCT 1}"THEN5Ø
                         :REM*7Ø
168Ø GOTO164Ø            :REM*6Ø
169Ø PRINT"{SHFT CLR}":GOSUB147
     Ø:PRINT"{HOME}{2 CRSR DNs}
     {2 CRSR RTs}WHERE IN MEMOR
     Y WOULD YOU LIKE TO"
                         :REM*248
17ØØ PRINT"{CRSR DN}{2 CRSR RTs
     }PUT SIZZLE?"       :REM*72
171Ø PRINT"{3 CRSR DNs}{8 SPACE
     s}1. SCREEN         :REM*9Ø
172Ø PRINT"{CRSR DN}{8 SPACEs}2
     . UNDER BASIC ROM ($AØØØ)"
                         :REM*122
173Ø PRINT"{CRSR DN}{8 SPACEs}3
     . TOP OF BASIC RAM"
                         :REM*252
174Ø PRINT"{CRSR DN}{8 SPACEs}4
     . $CØØØ             :REM*11Ø
175Ø PRINT"{CRSR DN}{8 SPACEs}5
     . YOU ENTER LOCATION"
                         :REM*15Ø
176Ø PRINT"{2 CRSR DNs}{4 SPACE
     s}PRESS NUMBER OF CHOICE "
     ;                   :REM*196
177Ø GOSUB252Ø:IFKEY$="{FUNCT 1
     }"THEN5Ø            :REM*4Ø
178Ø CV=VAL(KEY$):IFCV<1ORCV>5T
     HEN177Ø             :REM*224
179Ø ONCVGOSUB199Ø,2ØØØ,2Ø1Ø,2Ø
     2Ø,2Ø4Ø             :REM*142
18ØØ PRINT:PRINT"{SHFT CLR}{1Ø
     CRSR DNs}STANDBY... WRITIN
     G BOOT PROGRAM TO DISK.":P
     RINT                :REM*45
181Ø IFN2$=NM$THEN183Ø   :REM*233
182Ø PRINT#15,"RØ:"N2$"="NM$:GO
     SUB26ØØ             :REM*171
183Ø OPEN2,8,2,BN$+",P,W":GOSUB
     26ØØ:PRINT          :REM*93
184Ø PRINT#2,CHR$(38)CHR$(3)CHR
     $(52)CHR$(3);       :REM*33
185Ø FORAD=8Ø8 TO 819    :REM*145
186Ø PRINT#2,CHR$(PEEK(AD));:PR
     INT"{CRSR UP}WRITING BYTE
     #"AD-8Ø7            :REM*221
187Ø NEXT                :REM*95
188Ø I=Ø                 :REM*31
189Ø FOR AD=82Ø TO 11Ø3:REM*1Ø9
19ØØ I=I+1               :REM*1Ø1
191Ø PRINT#2,CHR$(B(I));:PRINT"
     {CRSR UP}WRITING BYTE #"AD
     -8Ø7                :REM*241
192Ø NEXT                :REM*145
193Ø I=Ø                 :REM*81
194Ø FOR AD=11Ø4 TO 2Ø38:REM*93
195Ø I=I+1               :REM*151
196Ø PRINT#2,CHR$(A(I));:PRINT"
     {CRSR UP}WRITING BYTE #"AD
     -8Ø7                :REM*161
197Ø NEXT                :REM*195
198Ø CLOSE2:GOTO5Ø       :REM*19
199Ø RI=11Ø4:RF=Ø:LF=Ø:GOSUB2Ø3
     Ø:A(81)=1:GOTO2Ø8Ø:REM*211
2ØØØ RI=4Ø96Ø:RF=1:LF=1:GOSUB2Ø
     3Ø:A(81)=Ø:GOTO2Ø8Ø
                         :REM*165
2Ø1Ø GOSUB2Ø3Ø:Q=Q-1166:RI=Q:RF
     =Ø:LF=1:Q=RI:A(81)=Ø:GOTO2
     Ø8Ø                 :REM*2Ø5
2Ø2Ø RI=49152:RF=Ø:LF=1:GOSUB2Ø
     3Ø:A(81)=Ø:GOTO2Ø8Ø
                         :REM*187
2Ø3Ø Q=PEEK(55)+PEEK(56)*256:RE
     TURN                :REM*161
2Ø4Ø PRINT"{SHFT CLR}{5 CRSR DN
     s}WHERE DO YOU WANT SIZZLE
      LOCATED?"          :REM*177
2Ø5Ø INPUT"{2 CRSR DNs}MEMORY L
     OCATION (DECIMAL VALUE)";R
     I                   :REM*156
2Ø6Ø RF=Ø:LF=1:Q=4Ø96Ø    :REM*176
2Ø7Ø GOTO2Ø8Ø             :REM*238
2Ø8Ø PRINT"{SHFT CLR}{3 CRSR DN
     s}"SPC(1Ø)"STANDBY..."
                         :REM*118
2Ø9Ø X=R+RI:GOSUB251Ø:A(399)=XL
     :A(4ØØ)=XH          :REM*226
21ØØ X=N+RI-1:GOSUB251Ø:A(92)=X
     L:A(93)=XH          :REM*12
211Ø X=N+RI:GOSUB251Ø:A(1Ø7)=XL
     :A(1Ø8)=XH:A(141)=XL:A(146
     )=XH                :REM*21Ø
212Ø A(118)=XL:A(119)=XH
                         :REM*116
213Ø X=F+RI:GOSUB251Ø:A(13Ø)=XL
     :A(131)=XH:A(169)=XL:A(17Ø
     )=XH                :REM*4
214Ø X=S+1+RI:GOSUB251Ø:A(143)=
     XL:A(144)=XH:A(174)=XL:A(1
     75)=XH:A(222)=XL    :REM*174
215Ø A(223)=XH:A(227)=XL:A(228)
     =XH                 :REM*38
216Ø X=S+2+RI:GOSUB251Ø:A(148)=
     XL:A(149)=XH:A(179)=XL:A(1
     8Ø)=XH:A(232)=XL    :REM*28
217Ø A(233)=XH           :REM*56
218Ø X=D+RI:GOSUB251Ø:A(172)=XL
     :A(177)=XH          :REM*78
219Ø X=T+RI:GOSUB251Ø:A(184)=XL
     :A(185)=XH:A(236)=XL:A(237
     )=XH:A(241)=XL      :REM*2ØØ
22ØØ A(242)=XH:A(153)=XL:A(154)
     =XH                 :REM*138
221Ø X=T+1+RI:GOSUB251Ø:A(189)=
     XL:A(19Ø)=XH:A(246)=XL:A(2
     47)=XH              :REM*224
222Ø X=J1+RI:GOSUB251Ø:A(158)=X
     L:A(159)=XH         :REM*3Ø
223Ø X=H+RI:GOSUB251Ø:A(192)=XL
     :A(193)=XH:A(256)=XL:A(257
     )=XH                :REM*62
224Ø X=M+RI:GOSUB251Ø:A(197)=XL
     :A(198)=XH          :REM*14Ø
225Ø X=G+RI:GOSUB251Ø:A(3Ø8)=XL
     :A(3Ø9)=XH:A(344)=XL:A(345
     )=XH                :REM*236
226Ø IFLF=ØTHENB=592:GOTO228Ø
                         :REM*15Ø
227Ø B=91Ø               :REM*76
228Ø X=B+RI:GOSUB251Ø:A(311)=XL
     :A(312)=XH:A(347)=XL:A(348
     )=XH:A(364)=XL      :REM*15Ø
229Ø A(365)=XH:A(421)=XL:A(422)
     =XH:A(5Ø8)=XL:A(5Ø9)=XH:A(
     376)=XL:A(377)=XH   :REM*1ØØ
23ØØ A(336)=XL:A(337)=XH
                         :REM*136
231Ø X=B+1+RI:GOSUB251Ø:A(371)=
     XL:A(372)=XH        :REM*163
232Ø X=B+2+RI:GOSUB251Ø:A(324)=
     XL:A(325)=XH        :REM*59
233Ø X=B+3+RI:GOSUB251Ø:A(327)=
     XL:A(328)=XH        :REM*1Ø3
234Ø X=K+RI:GOSUB251Ø:A(341)=XL
     :A(342)=XH          :REM*143
235Ø X=C+RI:GOSUB251Ø:A(354)=XL
     :A(355)=XH          :REM*165
236Ø X=U+RI:GOSUB251Ø:A(382)=XL
     :A(383)=XH          :REM*189
237Ø X=RI+61:GOSUB251Ø:A(9)=XL:
     A(1Ø)=XH            :REM*143
238Ø X=RI+8Ø:GOSUB251Ø:A(2)=XL:
     A(3)=XH:A(2Ø)=XL:A(21)=XH:
     A(34)=XL:A(35)=XH   :REM*35
239Ø X=RI+71:GOSUB251Ø:A(39)=XL
     :A(4Ø)=XH           :REM*147
24ØØ X=RI+82:GOSUB251Ø:A(5Ø)=XL
     :A(51)=XH           :REM*245
241Ø X=RI+81:GOSUB251Ø:A(56)=XL
     :A(57)=XH           :REM*143
242Ø X=RI+18:GOSUB251Ø:A(391)=X
     L:A(392)=XH         :REM*97
243Ø X=RI+83:GOSUB251Ø:A(386)=X ►
```

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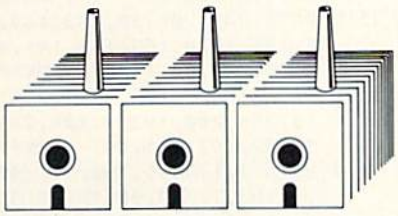

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```
    L:A(387)=XH          :REM*85
244Ø X=N-D+128Ø:GOSUB251Ø:A(151
    )=XL:A(156)=XH       :REM*255
245Ø A(53Ø)=LF:A(531)=RF
                         :REM*185
246Ø X=RI+84:GOSUB251Ø:B(6Ø)=XL
    :B(65)=XH:B(127)=XL:B(128)
    =XH:A(82)=XL:A(83)=XH
                         :REM*69
247Ø IFCV=2THENB(65)=7:B(6Ø)=23
    7:B(127)=237:B(128)=7:A(82
    )=237:A(83)=7        :REM*221
248Ø X=RI:GOSUB251Ø:B(119)=XL:B
    (12Ø)=XH             :REM*89
249Ø X=Q:GOSUB251Ø:B(52)=XL:B(5
    6)=XH                :REM*2Ø7
25ØØ X=RI+768:GOSUB251Ø:B(95)=X
    L:B(99)=XH:B(193)=LF:RETUR
    N                    :REM*69
251Ø XH=INT(X/256):XL=X-XH*256:
    RETURN               :REM*55
252Ø POKE2Ø4,Ø:POKE2Ø7,Ø:GETKEY
    $:IFKEY$=""THEN252Ø:REM*99
253Ø POKE2Ø4,1:PRINTCHR$(32)CHR
    $(2Ø);:RETURN        :REM*183
254Ø R=53Ø:N=893:F=529:S=2Ø8:D=
    533:T=516:J1=187:H=519:M=5
    13:PL=Ø:PH=Ø:PM=Ø:LN=Ø
                         :REM*95
255Ø G=441:B=9Ø9:K=417:C=415:U=
    428:V=439:X=Ø:PN=Ø:A=Ø:RI=
    Ø                    :REM*1Ø5
256Ø CV=Ø:AD=Ø:N2$="":T$="":J=Ø
    :I=Ø:Z$=CHR$(Ø):E$="":Q=Ø:
    RF=Ø:LF=Ø:DN=Ø       :REM*92
257Ø X$="{15 SPACEs}":KEY$="":N
    M$="":BN$=""         :REM*11Ø
258Ø RETURN              :REM*88
259Ø FORI=ØTO144:PN$(I)="":NEXT
    :RETURN              :REM*124
26ØØ INPUT#15,E,E$:IFE=ØTHENRET
    URN                  :REM*25Ø
261Ø PRINTE,E$:CLOSE2:CLOSE15:E
    ND                   :REM*216
262Ø FORI=828TO1ØØ6:READA:POKE
    I,A:NEXT:GOTO273Ø    :REM*92
263Ø DATA 169,14,162,8,16Ø,Ø,32
    ,186,255,169,4,162,235,16Ø
    ,3,32,189,255,32,192
                         :REM*1Ø
264Ø DATA 255,162,14,32,198,255
    ,16Ø,Ø,14Ø,57,3,132,25Ø,14
    Ø,56,3,165,48,133    :REM*1Ø4
265Ø DATA 254,24,165,47,1Ø5,7,1
    44,2,23Ø,254,133,253,169,Ø
    ,133,251,169,192,133
                         :REM*246
266Ø DATA 252,16Ø,1,32,2Ø7,255,
    166,144,24Ø,15,32,2Ø4,255,
    169,14,32,195,255    :REM*17Ø
267Ø DATA 172,56,3,136,132,254,
    96,192,6,144,45,2Ø1,34,2Ø8
    ,1Ø,173,57,3,73,1    :REM*166
268Ø DATA 141,57,3,16,31,174,57
    ,3,2Ø8,3Ø,192,32,2Ø8,22,16
    Ø,Ø,165,25Ø,145,253
                         :REM*226
269Ø DATA 132,25Ø,24,165,253,1Ø
    5,3,144,2,23Ø,254,133,253,
    76,119,3,2ØØ,76,121:REM*52
27ØØ DATA 3,14Ø,59,3,16Ø,Ø,145,
    251,165,25Ø,2Ø8,14,16Ø,1,1
    65,251,145,253,2ØØ:REM*168
271Ø DATA 165,252,145,253,238,5
    6,3,23Ø,25Ø,172,59,3,23Ø,2
    51,2Ø8,2,23Ø,252,76
                         :REM*1ØØ
272Ø DATA 166,3,36,48,58,42
                         :REM*194
273Ø FORI=1TO194         :REM*186
274Ø READB(I):NEXT:GOTO288Ø
                         :REM*72
275Ø DATA 169,2Ø2,141,38,3,169,
    241,141,39,3,173,244,3,2Ø8
    ,35,169              :REM*158
276Ø DATA 14,32,21Ø,255,169,243
    ,141,32,2Ø8,141,33,2Ø8,169
    ,216,133,252         :REM*172
277Ø DATA 169,Ø,133,251,16Ø,Ø,1
    62,4,145,251,2ØØ,2Ø8,251,2
    3Ø,252,2Ø2           :REM*32
278Ø DATA 2Ø8,246,169,Ø,133,55,
    169,16Ø,133,56,169,8Ø,141,
    48,3,169             :REM*Ø
279Ø DATA 4,141,49,3,173,236,3,
    162,22Ø,16Ø,3,32,249,253,1
    73,244               :REM*1Ø2
28ØØ DATA 3,24Ø,42,169,8Ø,133,9
    Ø,169,7,133,91,16Ø,128,169
    ,Ø,133               :REM*2ØØ
281Ø DATA 88,169,163,133,89,162
    ,4,32,232,163,169,147,32,2
    1Ø,255,169           :REM*82
282Ø DATA 254,37,1,133,1,32,Ø,1
    92,169,1,32,232,7,32,8Ø,4
                         :REM*147
283Ø DATA 134,45,132,46,173,245
    ,3,2Ø8,4,16Ø,5,2Ø8,2,16Ø,6
    ,185                 :REM*237
284Ø DATA 237,3,153,119,2,136,1
    6,247,173,245,3,2Ø8,4,169,
    6,2Ø8                :REM*77
285Ø DATA 2,169,7,133,198,162,1
    ,96,16Ø,16Ø,16Ø,16Ø,16Ø,16
    Ø,16Ø,16Ø            :REM*137
286Ø DATA 16Ø,16Ø,16Ø,16Ø,16Ø,1
    6Ø,16Ø,16Ø,Ø,19,17,82,85,7
    8,58,13              :REM*255
287Ø DATA Ø,Ø            :REM*153
288Ø FORI=2Ø5TO284       :REM*61
289Ø READB(I):NEXT:GOTO295Ø
                         :REM*141
29ØØ DATA 224,224,224,224,224,2
    24,224,224,224,224,224,224
    ,224,214,2Ø1,211,2Ø1:REM*3
291Ø DATA 194,2Ø4,197,224,211,2
    Ø1,218,218,2Ø4,197,224,224
    ,224,224,224,224,224
                         :REM*175
292Ø DATA 224,224,224,224,224,2
    24,224,224,224,224,224,194
    ,153,224,21Ø,129,153
                         :REM*171
293Ø DATA 224,21Ø,143,13Ø,133,1
    46,148,147,224,129,142,132
    ,224,2Ø8,136,137,14Ø
                         :REM*99
294Ø DATA 224,194,129,131,143,1
    42,224,224,224,224,224,224
                         :REM*251
295Ø FORI=921TO935       :REM*229
296Ø READ A(I):NEXT:GOTO298Ø
                         :REM*45
297Ø DATA 5,1,133,1,96,169,254,
    37,1,133,1,32,84,16Ø,96
                         :REM*81
298Ø FORI=1TO9Ø9         :REM*185
299Ø READA(I):NEXT:RETURN
                         :REM*37
3ØØØ DATA 173,8Ø,192,24Ø,27,16Ø
    ,Ø,185,61,192,32,21Ø,255,2
    ØØ,192,1Ø,2Ø8        :REM*235
3Ø1Ø DATA 245,2Ø6,8Ø,192,169,24
    4,141,49,3,169,165,141,48,
    3,96,238,8Ø,192      :REM*81
3Ø2Ø DATA 16Ø,Ø,185,71,192,32,2
    1Ø,255,2ØØ,192,9,2Ø8,245,1
    73,82,192,141,49     :REM*111
3Ø3Ø DATA 3,173,81,192,141,48,3
    ,96,83,73,9Ø,9Ø,76,69,32,7
    9,7Ø,7Ø,83,73,9Ø     :REM*193
3Ø4Ø DATA 9Ø,76,69,32,79,78,1,Ø
    ,Ø,Ø,16Ø,1,162,16,169,16Ø,
    157,2Ø5,7,2Ø2        :REM*113
3Ø5Ø DATA 2Ø8,25Ø,177,187,2Ø1,5
    8,24Ø,7,136,177,187,157,2Ø
    5,7,232,2ØØ,196      :REM*71
3Ø6Ø DATA 183,144,245,16Ø,Ø,185
    ,2Ø5,7,2Ø1,36,2Ø8,5,169,Ø,
    76,165,244,174       :REM*23
3Ø7Ø DATA 97,6,224,2,144,24,169
    ,1,133,255,169,2Ø5,141,33,
    5,169,7,141,34,5     :REM*99
3Ø8Ø DATA 169,1Ø4,141,84,6,169,
    6,76,11,5,169,12,133,255,2
    24,1,24Ø,3,141       :REM*134
3Ø9Ø DATA 97,6,169,1Ø1,141,33,5
    ,169,6,141,34,5,169,Ø,141,
    84,6,169,5,141       :REM*25Ø
31ØØ DATA 85,6,32,87,6,16Ø,Ø,18
    5,81,6,32,168,255,2ØØ,192,
    6,2Ø8,245,16Ø,Ø      :REM*126
311Ø DATA 185,255,255,32,168,25
    5,2ØØ,192,34,2Ø8,245,24,17
    3,33,5,1Ø5,34        :REM*176
312Ø DATA 141,33,5,144,3,238,34
    ,5,24,173,84,6,1Ø5,34,141,
    84,6,144,3,238       :REM*4Ø
313Ø DATA 85,6,32,174,255,198,2
    55,2Ø8,192,32,87,6,169,85,
    32,168,255,169       :REM*2Ø
314Ø DATA 67,32,168,255,32,174,
    255,173,17,2Ø8,41,7,24,1Ø5
    ,46,133,251,173      :REM*42
315Ø DATA Ø,221,41,7,133,252,9,
    32,133,254,169,255,162,4,6
    9,252,42,42,2Ø2      :REM*54
316Ø DATA 2Ø8,249,42,133,253,12
    Ø,32,9,6,44,16Ø,6,48,93,16
    4,195,166,196        :REM*148
317Ø DATA 165,185,24Ø,6,172,162
    ,6,174,163,6,132,174,134,1
    75,162,4,173,16Ø     :REM*5Ø
318Ø DATA 6,24Ø,21,32,241,5,32,
    9,6,173,16Ø,6,48,6Ø,24Ø,6,
    32,239,5,24,144      :REM*16
319Ø DATA 24Ø,162,2,16Ø,Ø,189,1 ►
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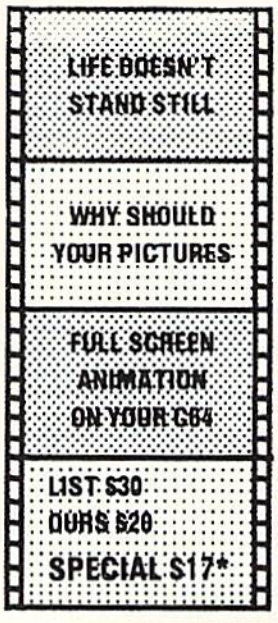

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      61,6,144,244,189    :REM*64
3200 DATA 160,6,145,174,200,32,
      252,5,24,173,83,192,240,3,
      32,18,192,166       :REM*230
3210 DATA 174,164,175,88,173,98
      ,6,240,38,169,1,76,232,7,1
      69,4,44,169,0,56    :REM*234
3220 DATA 176,233,162,2,160,0,1
      89,160,6,145,174,200,232,2
      08,247,24,152       :REM*106
3230 DATA 101,174,133,174,165,1
      75,105,0,133,175,96,160,0,
      165,254,141,0       :REM*8
3240 DATA 221,44,0,221,112,251,
      56,173,18,208,229,251,144,
      6,41,7,201,2,144    :REM*10
3250 DATA 242,165,252,141,0,221
      ,234,234,234,234,234,165,2
      53,77,0,221,42      :REM*180
3260 DATA 42,234,77,0,221,42,42
      ,234,234,234,234,77,0,221,
      42,42,234,77,0      :REM*14
3270 DATA 221,42,42,42,153,160,
      6,200,208,187,96,77,45,87,
      0,0,34,165,186      :REM*44
3280 DATA 32,177,255,169,111,76
      ,147,255,0,0,165,244,32,66
      ,208,32,24,193      :REM*186
3290 DATA 120,169,18,160,1,141,
      0,3,140,1,3,32,226,5,169,3
      ,133,54,162,7       :REM*164
3300 DATA 189,88,5,133,53,160,0
      ,177,53,201,130,208,24,160
      ,3,185,101,6,201    :REM*78
3310 DATA 42,240,48,201,63,240,
      4,209,53,208,7,200,192,18,
      208,236,240,33      :REM*68
3320 DATA 202,16,216,173,0,3,20
      8,202,169,255,141,0,3,32,1
      36,5,169,174,141    :REM*250
3330 DATA 7,28,88,76,69,217,226
      ,194,162,130,98,66,34,2,23
      0,53,160,0,177      :REM*255
3340 DATA 53,141,0,3,200,177,53
      ,141,1,3,32,226,5,32,136,5
      ,173,0,3,208,245    :REM*81
3350 DATA 169,247,45,0,28,141,0
      ,28,169,58,141,7,28,96,160
      ,0,185,0,3,74,74    :REM*51
3360 DATA 74,74,170,189,210,5,1
      70,169,1,44,0,24,240,251,1
      69,8,141,0,24       :REM*75
3370 DATA 169,1,44,0,24,208,251
      ,142,0,24,138,10,41,15,141
      ,0,24,185,0,3,41    :REM*17
3380 DATA 15,170,189,210,5,141,
      0,24,10,41,15,234,141,0,24
      ,234,234,234,169    :REM*187
3390 DATA 0,141,0,24,200,208,18
      5,96,0,4,1,5,8,12,9,13,2,6
      ,3,7,10,14,11,15    :REM*195
3400 DATA 172,1,3,132,7,173,0,3
      ,197,6,133,6,240,24,160,5,
      169,176,133,0,88    :REM*97
3410 DATA 165,0,48,252,120,165,
      0,201,2,144,6,136,208,237,
      76,102,195,169      :REM*105
3420 DATA 238,141,12,28,162,0,1
      34,51,134,48,160,6,132,50,
      160,3,132,49,32     :REM*243
3430 DATA 10,245,80,254,184,173
      ,1,28,153,0,3,200,208,244,
      160,186,80,254      :REM*157
3440 DATA 184,173,1,28,153,0,1,
      200,208,244,32,224,248,165
      ,56,197,71,240,4    :REM*59
3450 DATA 169,34,208,15,32,233,
      245,197,58,240,4,169,35,20
      8,4,96,24,105,24    :REM*37
3460 DATA 133,68,169,255,141,0,
      3,32,136,5,169,58,141,7,28
      ,165,68,76,200      :REM*105
3470 DATA 193,160,160,160,160,1
      60,160,160,160,160,160,160
      ,160,160,160,160    :REM*121
3480 DATA 160             :REM*167 ■
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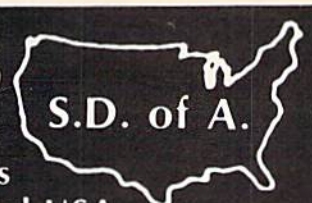

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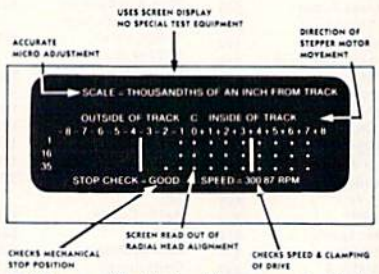

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HOW TO TYPE RUN LISTINGS

To simplify typing *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These follow a REM statement at the end of each line (e.g., :REM*123) and necessitate your using *RUN*'s Perfect Typist programs, listed below.

Type in 64 Perfect Typist (Listing 1) for 64 programs, or 128 Perfect Typist (Listing 2) for 128-mode programs, and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Jot down the two SYS numbers that appear on your screen. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN*. After you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line at the left margin. This is the checksum number, ranging from 0 to 255.

If this matches the checksum printed in the listing after the :REM*, you have typed that line correctly. Then type the next program line over the previous line's checksum value. If the checksum numbers do *not* agree, analyze the line on screen for errors or omissions. Make the needed changes and press the return key again to log them in. A new checksum will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, but before attempting to run it, turn the computer off and back on to completely clear out the Perfect Typist program.

You may save an incomplete program any time and continue it later. To do so, reload and run the Perfect Typist program, then load the program you were working on, list it, and continue from where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. Follow instructions inside curly brackets. For example, {SHIFT L} means you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times. R

Listing 1. 64 Perfect Typist program.

```
1 REM 64 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:N
   EXT
40 IFT<>16251 THEN PRINT"ERROR IN DATA..."
   :END
60 POKEML+4,PG:POKEML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,
   PG
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   ************************"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TY
   PIST IS NOW ACTIVE{2 SPACEs}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs
    }SYS"ML+30"=OFF **"
```

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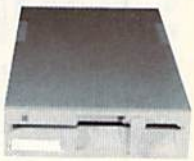

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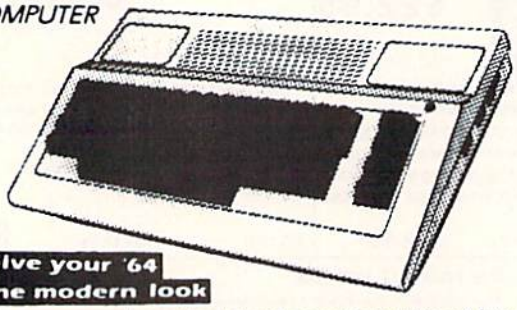

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HOW TO TYPE

```
101 PRINT"{CRSR RT}**********************
    ***************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

Listing 2. 128 Perfect Typist program.

```
1 REM 40/80 COL C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 FORX=5120TO5379:READD:T=T+D:POKEX,D
20 NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}E
   RROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{20 SPACEs}"
30 PRINT"{SHFT CLR}"A$" ****************
   ******************"
40 PRINTA$" ** 128 PERFECT TYPIST IS NOW A
   CTIVE **"
50 PRINTA$" **{2 SPACEs}SYS 5120=ON{7 SPAC
   Es}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$" ****************************
   ********":SYS5120:NEW
70 DATA 173,5,3,201,20,208,1,96,141,45,20,
   173,4,3,141,44,20,162,43,160,20
80 DATA 142,4,3,140,5,3,96,234,234,173,44,
   20,141,4,3,173,45,20,141,5,3,96
90 DATA 32,13,67,140,255,19,162,0,142,252,
   19,142,253,19,142,254,19,189,0,2
100 DATA 201,32,240,8,201,48,144,7,201,58,
    176,3,232,208,238,189,0,2,240,54
110 DATA 201,32,208,5,172,254,19,240,42,20
    1,34,208,10,72,173,254,19,73,1
120 DATA 141,254,19,104,72,238,253,19,173,
    253,19,41,7,168,104,24,72,24,104
130 DATA 16,1,56,42,136,16,246,109,252,19,
    141,252,19,232,208,197,173,252
140 DATA 19,24,101,22,24,101,23,141,252,19
    ,169,42,32,241,20,32,188,20,160
150 DATA 2,185,185,20,32,241,20,136,16,247
    ,165,116,208,9,165,117,208,5,169
160 DATA 145,32,241,20,172,255,19,96,13,32
    ,32,162,0,173,252,19,232,56,233
170 DATA 100,176,250,105,100,202,240,3,32,
    232,20,201,10,176,5,205,252,19
180 DATA 240,15,162,0,232,56,233,10,16,250
    ,24,105,10,202,32,232,20,170,72
190 DATA 138,9,48,32,241,20,104,96,170,173
    ,0,255,72,169,0,141,0,255,138,32
200 DATA 210,255,104,141,0,255,96
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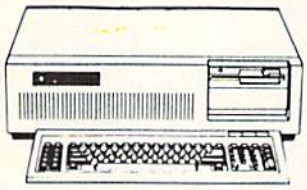

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Item: Due to an incredible coincidence of name and location, many readers of last March's Hardware Gallery who wanted to order the NLQ chip reviewed in that issue had trouble reaching the manufacturer. The saga is that we weren't aware, when the issue went to press, that the company had moved, so the address—in Sarasota, Florida—mentioned in the review was no longer correct. To aggravate matters, readers calling directory assistance for an ESP number in Sarasota were given the number of an entirely different ESP corporation in the same city! We have finally heard from the *real* ESP Corp., which had been flooded with written orders, but also with complaints about the wrong address and the phone number confusion. The name and current address of the NLQ chip manufacturer is ESP Rollshutter Corp., 501 Village Green Parkway, Suite 5, Bradenton, FL 33529; telephone 813-794-3876. The chip is priced at $57.50. We can't resist the comment that a little ESP on everyone's part would have helped enormously in this case.

Item: The Sprite Print program (May 1987, p. 68) will work better if you delete line 1310 and change line 1300 to read:

```
1300 FOR X = 0 TO 999:POKE 20000+X,PEEK(1024+X):NEXT:
     RETURN
```

Item: In the process of editing, two errors crept into the article accompanying the Linker 128 program in the July 1987 issue (p. 72). The third line just before the breakhead "Using Linker" on page 74 refers to line 40425, which doesn't exist. The line in question is 40245. Also, the program does not *require* you to declare variables at the beginning of the program, but simply *recommends* you do so—as in Pascal.

Item: The review of the 1764 RAM expander (July 1987, p. 47) stated incorrectly that the expander plugs into the user port of the C-64. No—the expander plugs into the *expansion* port.

Item: Author Charles Krumholt has advised us that a problem arises in his program, The Directory (Easy Applications, p. 77 of the August issue), when all the records in a file are deleted and you attempt to read from the file. Awaiting nonexistent information from the drive, the computer locks up. You can correct the problem by changing or entering the following lines:

```
1650 N=N-1:IFN<0THEN1950
1950 PRINT"{SHFT CLR}DELETING FILE:",F$
1960 OPEN15,8,15:PRINT#15,"S0:"+F$:CLOSE15
1970 GOTO10
```

If you encountered the problem, you should scratch the original empty file. The correction will prevent the problem from occurring again, but will not scratch a disk file that remains as an error of the old routine.

Item: Our attention was called to a flaw in Kenny Lawson's "C-64 Function Keys Made Useful" (September 1987, p. 63). The F8 key only changes colors to black, then stops. To fix this, change the fifth Data statement in line 430 from 33 to 32. Also, in line 80, change 57587 to 57586.

Item: In the November 1987 issue, two errors slipped through in Daniel Montes' article, "Color Hi-Res Graphics" (p. 70). In the last paragraph of column 1 on page 70, "See line 20" should read "See line 50." Also, in the third column on that page, after "6. Clear hi-res area . . .", there should be no B before SYS CS. ■

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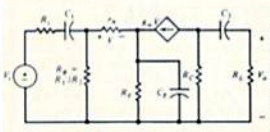

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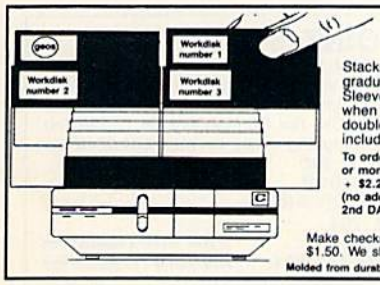

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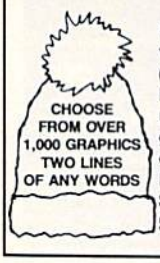

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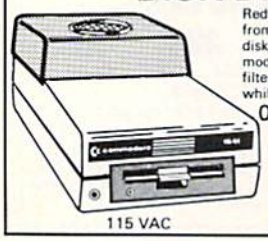

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RUN Back Issues Update

Partial listing of articles in RUN's 1986 issues:

January—Couple your Commodore to a VCR or slide projector. Keyboard lo-res animation. Public domain CP/M software. RUN's terminal program, Runterm Plus, part 2. Software Buyer's Guide, part 2. New education column. And more.

February—The 1571 disk drive. Custom characters and 80-column Ultra Hi-Res Graphics on the C-128. On-line medical services. Rename disks. Tax help. And more.

March—C-128 productivity software. *RUN*'s own word processor, RUN Script 64. Accessing Commodore character sets. C-64 "numeric keypad." CP/M support from Commodore. New telecommunications column. New Basic programming series. And more.

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April—Home-control software. RUN Script, part 2. Guide to CP/M software. Music editor. Auto-menu utilities for the 64 and 128. Change your 1541's device number. And more.

May—Printers and interfaces: what's available and how to choose. Print out Ultra Hi-Res graphics. One-on-one basketball game. Read and print out *any* file. Label Maker program. And more.

June—Introduction to GEOS. More on current printers. Redesign C-128 characters. Special section on education. File conversion and merge utilities. And more.

July—Commodore unveils new 64C family, 1581 disk drive and C-128 RAM expanders. Review of PaperClip II. *RUN*'s own electronic publishing software. And more.

August—Review of QuantumLink's Habitat. Disk Keeper program with nine disk utilities. Autoboot program. Career choice and career boost software. Custom characters on the C-64. New on-line Happenings column. RUNaway contest announced. And more.

September—Financial software, commercial and type-in. Quality screen shots. Turtle graphics for prereaders. RUN Basic 4.5. Create and print out signs. Notepad window. FSD-1 disk drive. CESnew product roundup. And more.

October—Small business and computer-aided-design software. Electronic ledger. Hi-res graphics without Peeks and Pokes. Interview with Commodore guru Jim Butterfield. New Mega-Magic column. Puzzle program. And more.

November—Spreadsheets: how they work and programs on the market. *RUN*'s own spreadsheet, CalcAid 64. CP/M sampler. Using printer interfaces. Relocatable screen dump. Hi-res joystick graphics on the C-128. And more.

December—Text-and-graphics software. Laser printers. Illustration update to *RUN*'s electronic publishing software. RUN Script 128. Speech software. Gifts for computer users. Spartan I review. And more.

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Each back issues cost $3.50 plus $1 shipping and handling. On orders of 10 or more back issues, there is a flat $7.50 shipping and handling fee. Quantities are limited. Send your order to *RUN*, Attn: Back Issue Orders, 80 Elm Street, Peterborough, NH 03458.

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JANUARY

COMING ATTRACTIONS

PERSONAL GROWTH—
The New Year is a time for turning over new leaves. In that spirit, our feature article in January will survey a wide range of software packages that can help you improve everything from your fitness to your ability to play chess.

TERMINAL PROGRAM—
Another highlight of the next issue will be a C-128 version of RUN Term, our telecommunications terminal program. RUN Term 128 offers the Punter and Xmodem protocols, 300- and 1200-baud transmission, autodialing, a 60K capture buffer and much more.

STRIKES AND SPARES—
Whether you and your friends are veteran bowlers or think a gutter is a trough for water, you're sure to enjoy our C-64 tenpin simulation.

MEMO BOOK PROGRAM—
RUN Dex, for the C-64, produces an electronic memo book you can organize and format any way you like. The memo book resides completely in memory, so you can flip through it quickly to find the entries you want.

SPEEDY PRINTER—
The January issue will also present a review of the new Okidata 180 printer, a dot matrix machine that produces hard copy at the rate of 180 cps. The 180 also offers numerous print options and both serial and parallel ports, and it doesn't need an interface.

1987 INDEX—
Last but not least, our first issue of 1988 will feature an index to all our 1987 articles and reviews. When you're looking for information on Commodore computing, *RUN*'s annual index should be one of the first places you turn.

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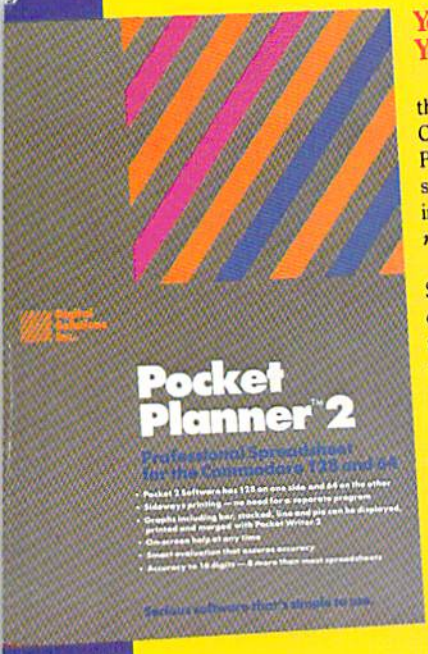

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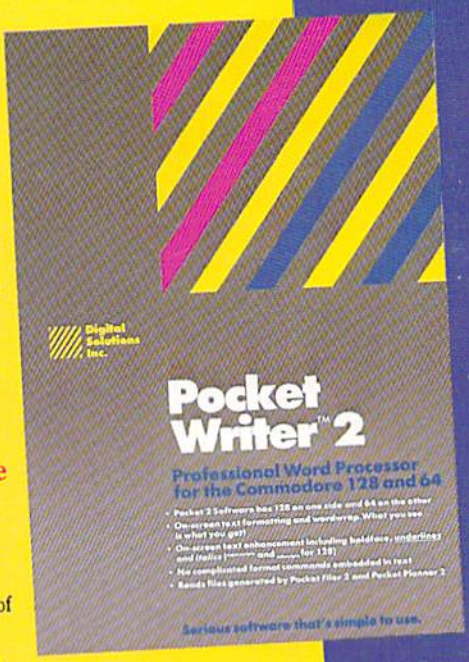

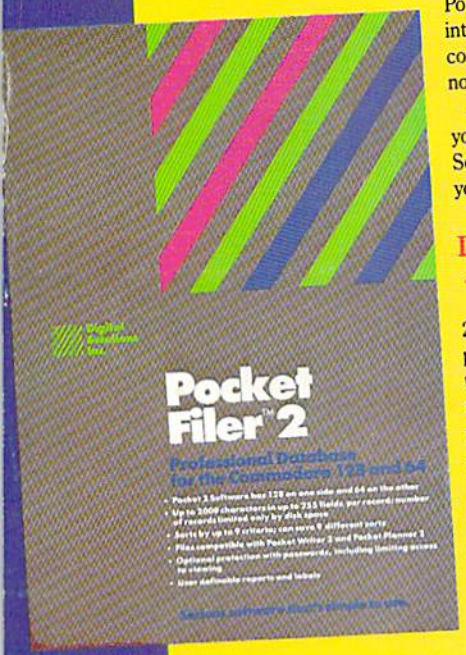

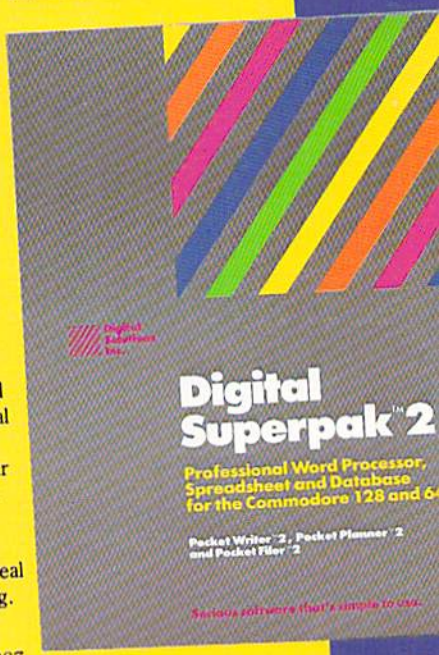

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