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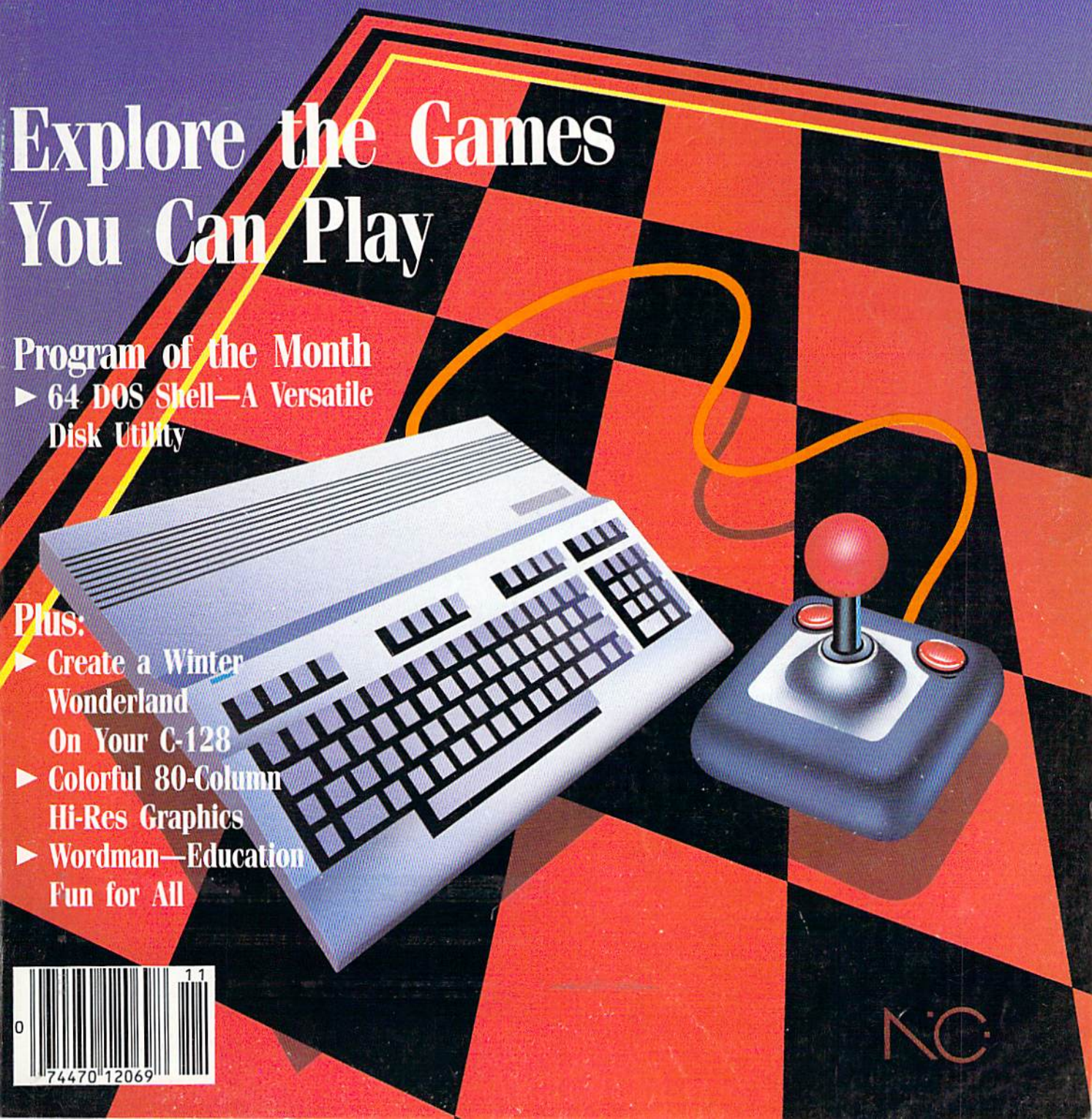
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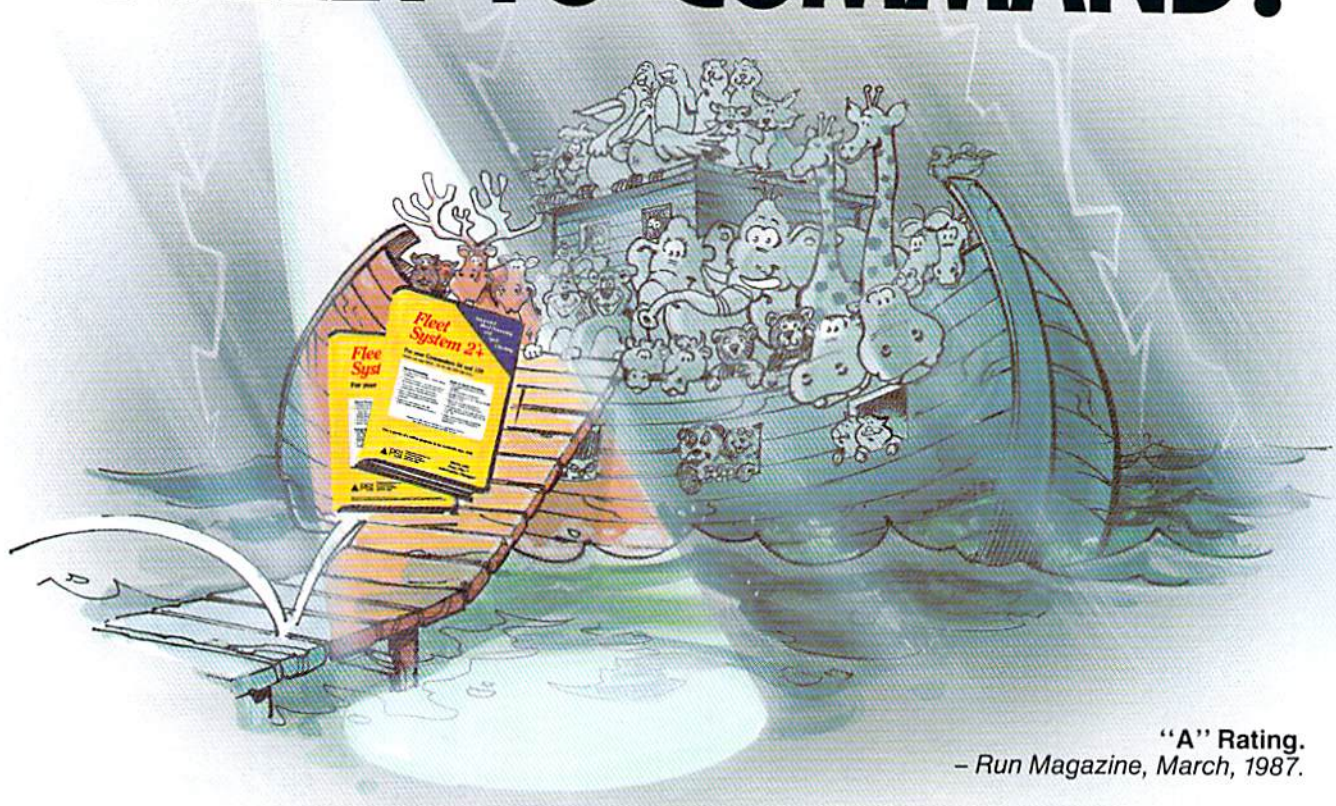
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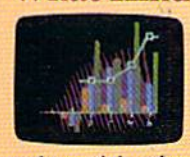
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RUNning Ruminations

Remembering the Past: A Look at PET User Notes.

Glory Days

Although its roots are buried well in the past, the microcomputing industry began just ten short years ago. Most of us were not there at the outset, but each of us has a story to tell about how he became involved with microcomputers.

A decade ago, the two Steves—Wozniak and Jobs—were marketing their Apple II computer, Tandy had introduced its TRS-80 Model I, and 2001 (the computer, not the movie) was Commodore's entrant in the microcomputer market race.

The PET 2001 was announced in May 1977, and delivery of the product started in September of that year.

I recently uncovered a collection (courtesy of David St. John of High Springs, FL) of *PET User Notes*, which chronicles the travails and triumphs of those early PET owners.

While computer magazines of that time featured articles about the PET, *PET User Notes*, which premiered in November 1977, was the first publication dedicated to this machine.

Spearheaded by Gene Beals, a full-time employee at A B Computers in Montgomeryville, PA (a distributor of early PET computers), *PET User Notes* was a bimonthly publication of the PET User Group and available to non-members for $5 a year.

Although the early issues were mostly written by Beals, *User Notes* featured articles by other PET users. Most notably, Dan Fylstra, who later introduced the microcomputing world to VisiCalc, and Jim Butterfield, who, through his articles and programs, did (and still does) much to promote Commodore computing.

Most of the articles published in the first issues were tutorial, explaining how to use and program the machine. For example, "CHAINING, or How To RUN Programs Too Large For Your Memory" by Dan Fylstra, "Using the PET's 8 Bit Parallel I/O Port" by Dan Fylstra, "PET Cassette File Usage" by Gene Beals and "PET's FOR-NEXT Loops, Arrays, and a Simple Sort Program" by Jim Butterfield.

The issues also contained program listings and played a very important role as a software exchange for PET users.

The concerns and interests facing these early users bear some resemblance to problems computerists face today:

—procuring software and hardware. There were a handful of software developers, including Commodore, who were encouraging authors to submit PET programs (on cassette, of course). Commodore was slow to market hardware support for the PET, but they eventually released peripherals such as printers, single- and double-disk drives and memory expansion. Commodore also later came out with 16K and 32K models of the PET.

—lack of documentation. Manuals were sketchy, and readers were starving for information on how to take advantage of their new machines. The PET came with an initial nine-page manual, which was replaced by a 38-page "temporary" manual. Then Commodore introduced a "new and improved" 50-page manual, with promises of a "real" manual. Supposedly, Chuck Peddle, the designer of the PET, left Commodore without finishing the PET manual.

The original PET computers were constructed with a metal case, and two versions were available—the PET 4K for $595 and the PET 8K for $795. Do-it-yourselfers—by adding a jumper and RAM chips—could upgrade their 4K machines to 8K at a cost of less than the $200 difference. However, most people were apparently willing to pay more for the installed additional 4K.

The computer came with a nine-inch black-and-white monitor (25 × 40 display), which featured good resolution, and the infamous square keyboard layout. Owners, particularly touch-typists, had a difficult time with this keyboard because the keys were lined up directly under one another—not offset as they are on a typewriter. (Subsequent PET units featured a full-size, standard keyboard.) *User Notes* also reported that keytop surfaces wore off on the more heavily used keys. At least one third-party developer offered frustrated users an alternate keyboard to overcome these shortcomings. However, one nice feature of the PET keyboard was its numeric keypad.

The early marketing thrust of Commodore was toward users to develop software for the machines and "to educational institutions where the PET will receive large exposure." It was also thought that the PET would play an important role in the business community, while, in these early days, little attention was given to the potential for the home market. Purchasers could order machines either directly from Commodore (located in Palo Alto, CA, at the time) or from dealers.

While PET (which stood for Personal Electronic Transactor) was a cute name for a computer, writers—in ads and article headlines—took every liberty with the word: "House-Break Your PET," "Tame Your PET," "Tricks To Help Train Your PET," or, my favorite, "Teaching Your PET to Bark."

PET User Notes may have been the first, but other PET-specific publications soon followed. The *PET Paper*, which was later incorporated into the now defunct *Midnight Software Gazette*, started in May '78. The name was quickly changed to simply *The Paper* upon Commodore's insistence that the word PET is proprietary. Note that both *PET User Notes* and, later, *PET Gazette* were obviously not as compliant to Commodore's request and used the PET name with impunity.

As they do today, those early user groups and publications played a comforting role in nurturing the microcomputer market. They were a valuable source of information, programs and, yes, reassurance for those somewhat adventurous, although easily frustrated, pioneers who walked the microcomputing frontier.



Dennis Brisson
Editor-in-Chief

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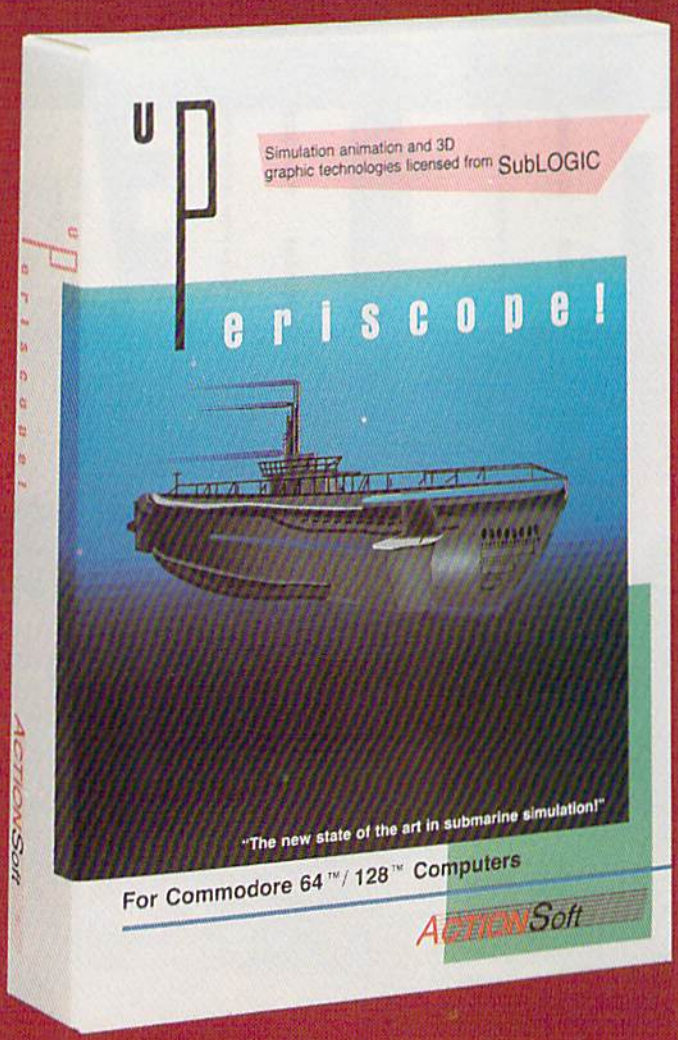
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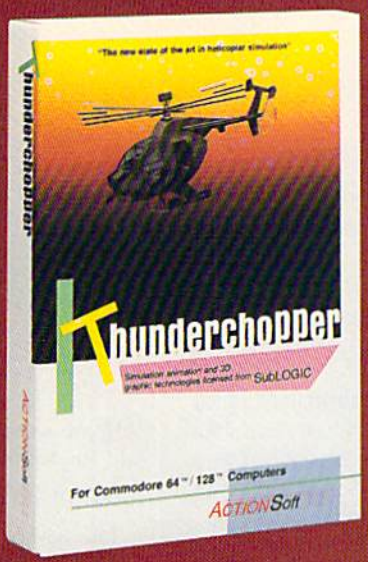




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Compiled by JIM BORDEN

$43C C-128 Directory Name Array

I liked C-64 Directory Name Array (July 1987) so much that I wrote this version for the C-128. In the process, I added a variable, F, for pattern matching.

```
5 REM C128 DIR READ-JON R CURTIS
10 FORI=3072TO3279:READX$:X=DEC(X$):POKEI,
   X:T=T+X:NEXT
15 IFT<>28041THENPRINT"DATA ERR.":END
20 POKE58,243:CLR:F$="$":X=LEN(F$)
25 FORI=1TOX:POKEI+3282,ASC(MID$(F$,I)):NE
   XT:POKE3082,X
30 DATA 169,14,162,8,160,0,32,186,255,169,
   1,162,211,160,12,32,189,255,32,192
35 DATA 255,162,14,32,198,255,160,0,140,21
   0,12,132,250,140,209,12,165,50,133
40 DATA 254,24,165,49,105,7,144,2,230,254,
   133,253,169,0,133,251,169,243,133,252
45 DATA 160,1,32,207,255,166,144,240,13,32
   ,204,255,169,14,32,195,255,174,209,12
50 DATA 202,96,192,6,144,54,201,34,208,10,
   173,210,12,73,1,141,210,12,16,40,174
55 DATA 210,12,208,39,192,32,208,31,169,25
   3,141,185,2,165,250,162,1,160,0,32
60 DATA 119,255,132,250,136,24,165,253,105
   ,3,144,2,230,254,133,253,76,192,12
65 DATA 200,76,61,12,140,208,12,160,0,162,
   251,142,185,2,162,1,32,119,255,165
70 DATA 250,208,25,160,1,165,251,162,253,1
   42,185,2,162,1,32,119,255,200,165,252
75 DATA 162,1,32,119,255,238,209,12,230,25
   0,172,208,12,230,251,208,2,230,252
80 DATA 192,255,240,3,76,104,12,200,240,24
   0
85 :
90 DIMA$(145):SYS3072:RREG,N
95 FORI=1TON:PRINTA$(I):NEXT
```

As with the C-64 version, the array that stores the directory must be the first array dimensioned. In my demo, A$(0) contains the disk name, with the filenames starting in A$(1). The number of filenames is passed to Basic with the RREG,N command. Be sure to use a comma before the variable.

—Jon R. Curtis, Central Point, OR

$43D A Better Filename

Here's a time-saver that will simplify your disk loads. When you save your files, add a prefix of two characters and a shifted space to the beginning of the filename, keeping the prefix plus filename within the usual 16-character limit.

Here's an example. Save the RUN Script boot program to disk with "WP<shifted space>RUNSCRIPT 128". It will appear as "WP"RUNSCRIPT 128 in the directory. As far as the disk is concerned, the file is named WP and can be loaded with LOAD "WP",8. Try it with several programs.

—Eric Pedersen, APO, NY ►

TRICK OF THE MONTH

$43E C-64 BSave Command

I frequently need to save parts of memory on the C-64, so I wrote the program below to add a BSave-type command to the 64.

```
5 REM MEMORY SAVER-HAZEM JAUNI
10 REM SYNTAX= !"NAME",START ADR,END ADR+1
15 FOR N=51200TO51330:READQ:POKEN,Q:C=C
   +Q
20 NEXT:IFC<>16574THENPRINT"ERROR!":END
25 DATA 120,169,13,160,200,141,8,3,140,
   9,3,88,96,120,160,1,177,122,201,33
30 DATA 208,77,32,115,0,32,115,0,201,34
   ,208,67,160,1,177,122,240,61,201,34
35 DATA 240,12,201,44,240,53,153,239,20
   0,200,192,17,208,236,152,56,101,122
40 DATA 133,122,169,0,101,123,133,123,1
   36,152,162,240,160,200,32,189,255
45 DATA 169,2,162,8,160,1,32,186,255,32
   ,253,174,32,103,200,169,250,32,216
50 DATA 255,88,76,174,167,88,76,228,167
   ,32,138,173,32,247,183,32,253,174
55 DATA 165,20,133,250,165,21,133,251,3
   2,138,173,32,247,183,166,20,164,21
60 SYS51200:NEW : DATA 96
```

If you want to use this routine to save memory to tape, add the following line to the listing:

```
25 POKE 51278,1
```

The syntax for the new command is !<filename>,<start address>,<end address> + 1.

—Hazem Jauni, E. Jerusalem, Israel

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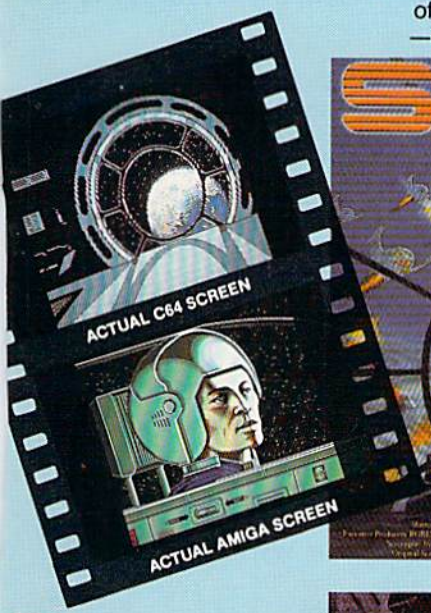
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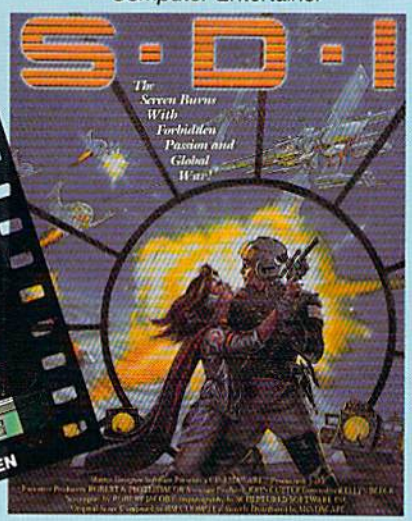
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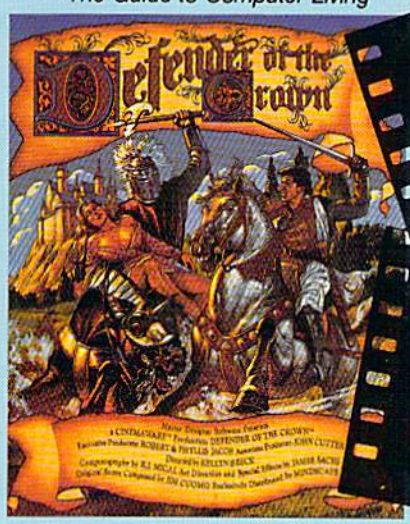
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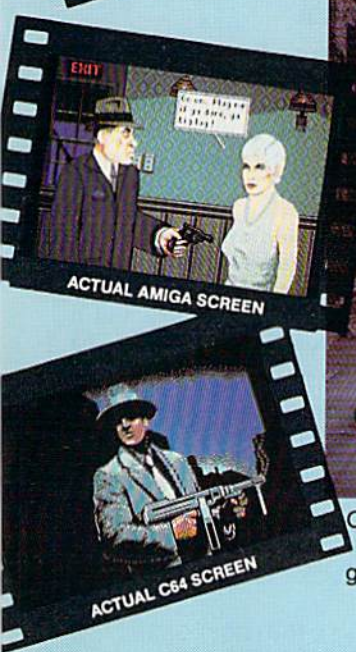
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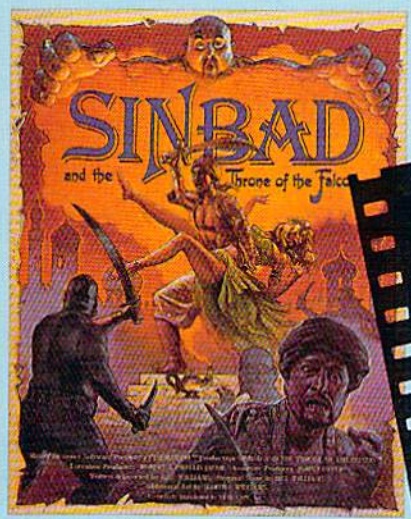


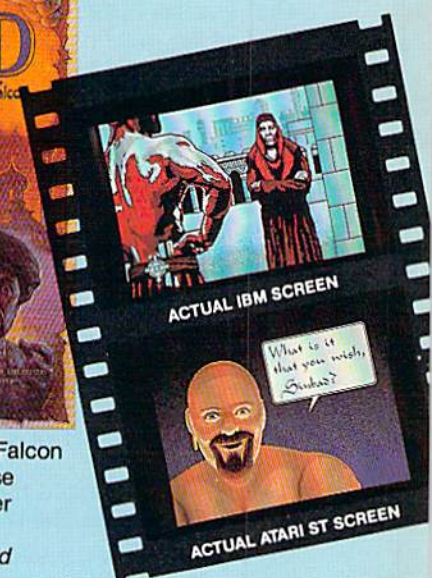












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$43F Variable Tabs for Any Printer

Tabs don't print out in hard copy the same way they appear on the screen. The following program will show how to align columns at the right or the left to get the tabs to print out right. It will work with any printer and computer.

```
10 REM PRINTER COLUMNS-GEORGE VOGLER
20 OPEN4,4:H=20:REM COL WIDTH
30 FORI=1TO8:READ DA$:HT=H-LEN(DA$)
40 PRINT#4,SPC(HT)DA$SPC(H)DA$SPC(HT)"."
50 NEXT:PRINT#4:CLOSE4
60 DATA 2,100,2002,393939,55,5335,8,4321
```

The program prints four columns of data. The first column is left-justified, the second is blank, the third is right-justified, with the cursor ready for the fourth. The fourth column contains just a period to show that it's properly aligned.

—George W. Volger, Houston, TX

$440 64 Input with Sound

This Get routine disables the cursor keys and other non-printing keys and produces a soft beeping sound as each character is typed in.

```
90 REM INPUT WITH SOUND EFFECTS-JOSEPH R.
   CHARNETSKI
100 R=54272:FORJ=RTOR+23:POKEJ,0:NEXT
110 POKER+5,28:POKER+24,15:PRINT"{SHFT CLR
   }
120 PRINT"[PROMPT HERE] ";
130 PRINT"{CTRL 9} {CRSR LF}{CTRL 0}";
140 GETA$:IFA$=""GOTO140
150 IFA$=CHR$(13)THENPOKER+1,32:POKER+4,21
   :PRINT" ":POKER+4,20:GOTO220
160 IFA$=CHR$(20)ANDLEN(C$)THENC$=LEFT$(C$
   ,LEN(C$)-1):GOTO190
170 IFA$<CHR$(32)ORA$>CHR$(127)ANDA$<CHR$(
   160)GOTO140
180 C$=C$+A$
190 POKER+1,28:POKER+4,17:PRINTA$;
200 IFA$=CHR$(34)THENPOKE212,0
210 POKER+4,16:GOTO130
220 REM CONTINUE HERE...
```

—Joseph R. Charnetski, Dallas, PA

$441 Protect Your ML

Commodore 128 programmers who use the Graphic1: Graphic5 commands to relocate the start of Basic to $4000 to open up a large area in shared RAM ($1300-$3FFF) may be placing their programs in jeopardy!

Here's why: The Graphic5 command doesn't clear location $D8 as Graphic0 does. $D8 must be cleared to send text to the current screen, using the CHAR command, rather than to the bit-mapped screen where your code is stored. If the byte isn't cleared, CHAR will print the text over your ML code!

Always issue a Graphic0 command prior to Graphic5, or store a 0 in location $D8 (216 decimal).

—Bob Kodadek, Aston, PA

$442 Customizer Program

Here's a program I use to automatically customize my C-128 in either C-128 or C-64 mode. It will also load a menu program for you, remind you what computer you're using when you're in 40-Column mode and display the function keys at the bottom of the 128 screen. (You should change these to match your own definitions.) If you use a C-64 only, eliminate the If statement at the end of line 40. You don't need to enter lines 90–140.

```
10 REM C-64/128 CUSTOMIZER-BOB KNIBB
20 M$="DO YOU WISH TO SEE A MENU (Y/N) {CT
   RL O}?"
30 POKE53280,0:POKE53281,0:PRINTCHR$(142)"
   {2 HOMEs}{SHFT CLR}";
40 FORS=55333TO55335:POKES,1:NEXT:IF FRE(0
   )<>FRE(1)THEN90
50 POKE646,7:POKE1062,54:POKE1063,52:PRINT
   "{CRSR DN}"M$;
60 GETA$:IFA$=""THEN60
70 PRINT"{CRSR LF}"A$:IFA$="N"THEN NEW
80 POKE46,PEEK(44)+8:CLR:LOAD"MENU64",8
90 KEY1,"DATA ":KEY4,"PRINT":KEY8,"RENUMBE
   R"+CHR$(13):COLOR5,15:POKE235,22
100 IFPEEK(215)THENFAST:COLOR6,1:PRINT:L=4
   :GOSUB130:WINDOW0,0,79,23:GOTO120
110 POKE1061,49:POKE1062,50:POKE1063,56:GO
   SUB130:GOSUB130:WINDOW0,1,39,22
120 COLOR4,8:PRINTM$:GETKEYA$:PRINT"{SHFT
   CLR}":IFA$="Y"THENRUN"MENU128":ELSE NE
   W
130 PRINT:FORI=1TOL+4:READF$,K$:PRINT"{CTR
   L 9}"F$"{CTRL 0} "K$"{2 SPACEs}";:NEXT
   :RETURN
140 DATA F1,DATA,F2,LOAD,F3,DIREC,F4,PRINT
   ,F5,SAVE,F6,RUN ,F7,LIST ,F8,RENUM
```

—Bob Knibb, Walkersville, MD

$443 ML Memory Transfer

Transferring large blocks of memory on the C-64 sometimes seems to take an eternity. Machine language routines can transfer them quickly, but why reinvent the wheel? Use the built-in Basic ROM routine at $A3EC (41964). This routine will copy the character set (2K of memory), for example, in less than a second.

You must provide a starting and ending address for the area to be copied and a new starting address to copy it to. These addresses are entered in lines 50 and 80 of the program below. This program demonstrates the transfer command by copying the character set (uppercase/graphics only), and it customizes the character set with an underlined cursor. The subroutine at line 120 calculates the addresses required and does the actual transfer.

```
10 REM MEMORY XFER-ROBERT B COOK
20 REM -XFER CHAR ROM-
30 POKE52,56:POKE55,0:POKE56,56:CLR
40 POKE56334,0:POKE1,51
50 SA=53248:EA=55296:NS=14336:GOSUB120
60 POKE1,55:POKE56334,1:POKE53272,30
70 REM -REV TO U.LINE-
80 SA=14336:EA=15359:NS=15360:GOSUB120
90 FORI=15367TO16390STEP8:POKEI,255:NEXT
100 END
110 REM -TRANSFER MEMORY SUB-
120 EA=EA+1:L=EA-SA:NE=L+NS
```

```
13Ø X=INT(L/256):Y=L-256*X
14Ø A=INT((NE-Y)/256):B=NE-256*A-Y
15Ø C=INT((EA-Y)/256):D=EA-256*C-Y
16Ø POKE781,X+1:POKE782,Y
17Ø POKE88,B+1:POKE89,A
18Ø POKE9Ø,D+1:POKE91,C
19Ø SYS41964:RETURN
```

—Robert B. Cook, Braintree, MA

$444 Lo-Res Draw Program

My program lets you make simple drawings on the C-64's 40-column screen, and it's easy enough for a child to use. Use a joystick in port 2 to control the cursor. The fire-button, or any key except home, changes the colors. Change the color to black to erase the drawing. Use the home key to clear the screen and start a new picture.

```
1Ø REM LO-RES DRAW - ADAM MILLER
2Ø POKE53281,Ø:POKE5328Ø,Ø:C=1:X=Ø:Y=Ø:PRI
   NT"{SHFT CLR}"
3Ø J=PEEK(5632Ø):F=JAND16:J=15-(JAND15):IF
   J=1ORJ=5ORJ=9THENY=Y-1
4Ø IFJ=2ORJ=6ORJ=1ØTHENY=Y+1
5Ø IFJ=4ORJ=5ORJ=6THENX=X-1
6Ø IFJ=8ORJ=9ORJ=1ØTHENX=X+1
7Ø GETA$:IFA$>""OR F=Ø THENC=C+1:IFC=16THE
   NC=Ø:FORJ=1TO2ØØ:NEXT
8Ø IFA$="{HOME}"GOTO2Ø
9Ø IFX>39THENX=Ø
1ØØ IFY>24THENY=Ø
11Ø IFX<ØTHENX=39
12Ø IFY<ØTHENY=24
13Ø POKE1Ø24+X+4Ø*Y,81:POKE55296+X+4Ø*Y,C
14Ø GOTO3Ø
```

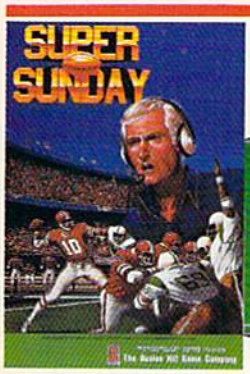
—Adam Miller, Brandon, SD

$445 C-128 Sprite Reduction

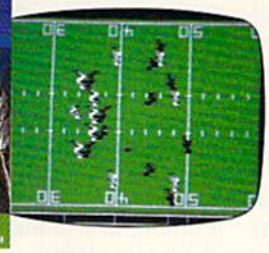
The following program produces seven consecutive reductions of any sprite you design, to give the illusion that the object is moving away. The program will ask for the sprite number of the sprite you want to reduce. Be sure that any other sprites are saved, since the new ones will be stored in the sprite area. After the reduction is complete, the sprites will be displayed on the screen for you to view.

```
1Ø REM SPRITE REDUCER-MARCO HAGELSIEB
2Ø INPUT "{SHFT CLR}{4 CRSR DNs} SPRITE NU
   MBER (1-8)";SN:IFSN<1ORSN>8THEN2Ø
3Ø COLOR Ø,7:COLOR4,7:COLOR1,8:GRAPHIC1,1:
```

Continued on p. 120.

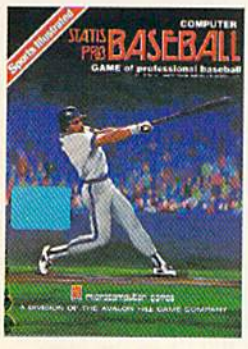


BIG LEAGUE SPORTS



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

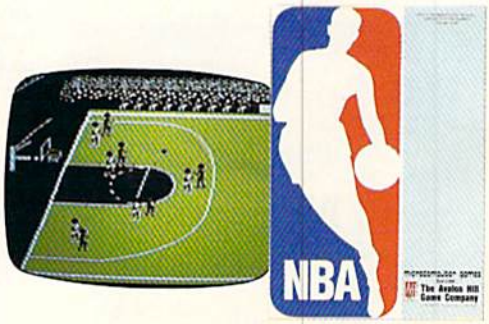
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News and New Products

What's in store for personal computers of the future? Who won the 1988 presidential election? Give up trying to solve your computer game? What else is new?

Compiled by HAROLD R. BJORNSEN

Sign On the Dotted Line

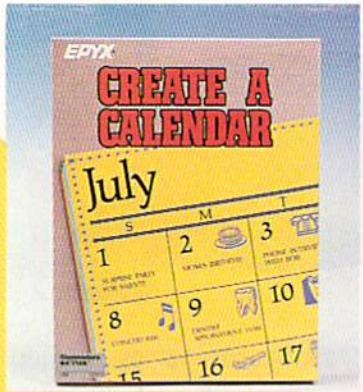
DENVER—MicroLawyer, a disk library of over 100 common legal documents for personal, business and corporate use, is intended as a do-it-yourself step saver to be used in conjunction with legal advice. You can prepare a complete range of legal documents and contracts, using your own word processor. Documents include power of attorney, premarital agreements, affidavits, leases, loan and mortgage forms, real estate contracts, wills, notary public forms, generic contracts for services and articles of incorporation. MicroLawyer, for the C-64, is available from Progressive Peripherals & Software (464 Kalamath St., Denver, CO 80204) for $59.95.

Check Reader Service number 410.

Back in Time

REDWOOD CITY, CA—Epyx (PO Box 8020, Redwood City, CA 94063) has released Create a Calendar, a program that creates a variety of personal calendars for home, school or business use. The calendar can include a variety of text, graphics and borders; graphics for birthdays, dental appointments, haircuts, jury duty, New Year's Day and Mother's Day. Graphics from Epyx's Graphics Scrapbook collection and other graphics disks compatible with The Print Shop can also be incorporated into the design. You can produce daily, weekly, monthly and annual calendars in sizes ranging from letters to a six-page horizontal annual banner. Create a Calendar is available for the C-64 for $29.95.

Check Reader Service number 403.



Have fun keeping track of important dates with Create a Calendar from Epyx.

Back to Kerovnia

RAHWAY, NJ—The Guild of Thieves, the illustrated adventure sequel to The Pawn, takes place in the mythical kingdom of Kerovnia. The adventure combines dialogue, graphics, humor and puzzles. A 40-page novella, a Bank of Kerovnia credit card, an Indenture and Contract of Service Certificate, dice and play guide are also included in the package. It's available for the C-64 for $39.95 from Firebird, PO Box 49, Ramsey, NJ 07446.

Check Reader Service number 404.

Slay the Black Knight

CAMPBELL, CA—Set in medieval times, Dark Castle features a hero, controlled by the players, who must fight his way through 14 rooms of increasing difficulty against plague-infested rats, attacking bats and a fire-breathing dragon. He must also escape the clutches of the dungeon's torturer and the spells of a diabolical wizard to find and slay the notorious Black Knight. It's available for the C-64 for $34.95 from Three Sixty, Inc., 2105 S. Bascom Ave., Suite 290, Campbell, CA 95008.

Check Reader Service number 409.

Lock or Unlock

ENGLEWOOD CLIFFS, NJ—Prentice Hall (Englewood Cliffs, NJ 07632) has released two computer books for popular computers, including the Commodore line.

Computer Cryptology explains how to provide a protective blanket to keep your information from prying eyes. The 300-page softcover, with 83 illustrations, gives methods of disguising your data through encryption and enciphering so that only authorized deciphering can recover the original data. $21.95.

Keys to Solving Computer Adventure Games has clues for all-text and for graphics/text adventures for players who have struggled so long to find the golden key to the dungeon door or to at last pry open the crypt. The 300-page paperback contains 250 illustrations. $19.95.

Check Reader Service number 413.

George Bush by a Landslide

MOUNTAIN VIEW, CA—Strategic Simulations (1046 N. Rengstorff Ave., Mountain View, CA 94043) has announced that George Bush won the 1988 U.S. Presidential election with 499 electoral votes to runner-up Senator Albert Gore's (D-KY) 39 votes. Popular vote percentages were also highly skewed in Bush's favor, 55 percent to 45 percent. Observers termed the victory "a landslide."

SSI, maker of strategy war games for the C-64, used its computer-simulated election game, President Elect—1988 Edition, to conduct the race for President at a charity gaming event in the SSI suite at the Consumer Electronics Show in Chicago last June. The game allows players to simulate any election from 1960 to 1988, using actual figures from a large roster of historical or present-day candidates.

1991 PC

DALLAS—The editors of the *Computer Industry Almanac*, a 780-page reference volume for the computer industry, have taken a look ahead to describe the capabilities of typical personal computer systems in the $1000–$3000 range in 1991.

The *Almanac* editors say that the $3000 office system in 1991 will have ten times the computing power, 12 times the main memory and nearly 100 times the mass storage capability of today's typical personal computer, plus a high-speed mo-

dem and a built-in local area network interface to allow communication with colleagues and independent electronic information sources.

The $1000 system will be a scaled-down version of today's office PC, with CD ROM for entertainment and recreation applications. It will have a 32-bit microprocessor, four megabytes of main memory, one 3½-inch floppy disk, a color display, one CD ROM drive and a letter-quality or near-letter-quality printer. Its performance will be between one and one-and-a-half million instructions per second.

Makin' Bacon

COLORADO SPRINGS—Investment Simulation, for the C-64 and C-128, computes the internal and equity rates of return, present net worth, life-cycle costs and capitalized present value. The focus of the program is on limited equity investments and leveraging. A 51-page handbook is included. Available for $36 from Pyxis Software, PO Box 18016, Colorado Springs, CO 80935.

Check Reader Service number 407.

The Key to Write Protection

LYONS, CO—The DisKey, a plastic key that takes the place of write-protect tabs, snaps into place in the left side of your disk drive opening, above the floppy disk. It can be inserted any time after the disk is in place and only one key is needed for all your disks. DisKey fits most 5¼-inch disks and drives and is available from CroResearch (PO Box 129, Lyons, CO 80540) for $2.98.

Check Reader Service number 408.

Buying Software For Tots?

YPSILANTI—*The 1987 Survey of Early Childhood Software* rates 229 early childhood (for ages 3–6) programs published by popular software companies, including Commodore. A brief description and equipment requirements, cost and how to order are included for each program. Listings are keyed to eight major curriculum areas to match the software to curriculum goals for your child. The catalog rates each program according to user friendliness, content, technical features, menu design, ease of use, reinforcement and other criteria. Order it from High/Scope Press, 600 N. River St., Ypsilanti, MI 48198 for $20.

Check Reader Service number 402.

What are You *Eating*?

MUSTANG, OK—Diet Analysis monitors your daily intake of food and drink, tracking 25 nutrients and eight amino acids to find the nutrient deficiencies in your diet pattern. Also included in the package are the Nutrient Finder program, which prints out the nutrition contents of foods you select, and Change or Add, which lets you remove, change or add records to fit your needs. Diet Analysis has data of 500 food and drink items and 165 available records for you to add new records. Available for the C-64 for $29.95. Diet, PO Box 649120, Mustang, OK 73064.

Check Reader Service number 411.

Can You Defeat the Russians?

McALLEN, TX—Borodino: 1812, Napoleon in Russia, gives you the chance to accomplish what Napoleon Bonaparte could not: conquer Russia. The game covers the entire three days of the bloody battle. Eight historical and what-if scenarios take 15–20 minutes to complete, and the complete battle requires over four hours to finish. The joystick-controlled system lets you control infantry lines, column formations and infantry stacking. You play Napoleon and the computer plays the Russians, or you can use the two-player option, which includes instructions for playing by mail. There are three levels of play, with Fatigue and Morale options. It's available for the C-64 for $59.95 from Krentek Software, 5401 N. 10th, Suite 214, McAllen, TX 78504.

Check Reader Service number 412.

Infocom's Plundered Hearts, a romance adventure set on the high seas, is specifically aimed at women.



Damsel in Distress

CAMBRIDGE—Your decisions determine your fate in Plundered Hearts, the first entry in the romance genre for Infocom (125 CambridgePark Drive, Cambridge, MA 02140). As heroine aboard the *Helena Louise*, you find adventure at every turn as you sail to your ailing father's side. But things are not as they seem. Scheming and deception abound. A damsel in distress could easily end up in Davey Jones' locker. It's available for the C-64 for $34.95.

Check Reader Service number 405.

Set Your Computer Free

ENGLEWOOD, CO—Image Technology (8150 South Akron St., Suite 405, Englewood, CO 80112) offers a large-capacity print buffer that mounts inside your Epson printer. With it, you can transfer data to the printer at computer speed so you can use your printer without waiting. It's available in 256K ($133) and 512K ($157) sizes.

Check Reader Service number 400.

CAD-64/128

POCAHONTAS, AR—Weaselgraphics (606 Thomasville Rd., Pocahontas, AR 72455) has released several CAD disks for the C-64 and C-128 for $20 each.

With the programs, hobbyists and engineers with technical background can design professional oscillators, amplifiers, power supplies, filters, impedance-matching circuits and lay out circuit boards. In addition, the hobbyist can specify drift over exact temperature ranges the circuit will be used in, and the technician can replace tube circuits with solid state circuits. The programs can be used to design new devices, modify old ones and assist in making repairs.

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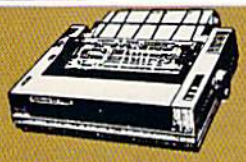
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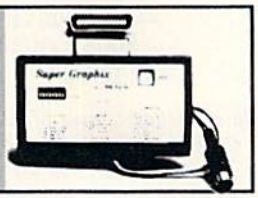
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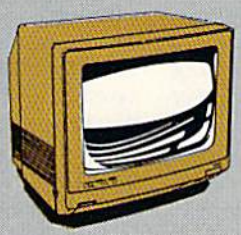
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11/87

MAIL RUN

This month: an end to confusion on getting the NLQ Chip, a request for software for the physically disabled, and more.

ESP NEEDED

I'm writing this letter to clear up any difficulty *RUN* readers may be having in reaching ESP Corporation about the NLQ Chip reviewed in last March's issue. The Chip module improves the typeface on Gemini 10X, 15X and Delta 10/15 printers.

In September of 1986, the company, which is officially called ESP Rollshutter Corporation, moved from 7900 Tamiami Trail, Sarasota, FL, to Village Green Parkway, Bradenton, FL. When the *RUN* review appeared, it gave our old Sarasota address and phone number. Further complicating matters, there's another ESP Corporation in Sarasota, so people calling telephone information are given their number instead of ESP Rollshutter's. The review also generated a flood of inquiries and orders, and the owner, Hans Roth, contracted my secretarial services to help out.

We're sorry that many *RUN* readers have been inconvenienced because of our move and the fact that there's another ESP in Sarasota.

—KAREN J. RITTER
ESP ROLLSHUTTER CORPORATION
501 VILLAGE GREEN PARKWAY
BRADENTON, FL 33529
813-794-3876

We're also sorry that an incorrect address and phone number appeared in our pages, and we thank Ms. Ritter for clearing up this confusing situation.

—EDITORS

SOFTWARE FOR THE DISABLED?

I have multiple sclerosis and encounter a number of problems that make using a computer difficult. The problems include fatigue, tremor and spasms in my hands and visual disturbances. If you know of any sources of programs, especially public domain programs, that make using a Commodore easier for the physically handicapped, please let me know. Also, I know there are voice modules and light pens available to aid in entering information, but how about a magnification screen, similar to an antiglare screen, for reading output on the monitor?

—CATHERINE S. FIRMIN
3003 LOUISIANA AVE.
LAKE CHARLES, LA 70601

In last February's issue of RUN, *the Resource Center column was devoted to this subject. It specifically described the work of Don Peterson, a retired electronics engineer who's devoting his "second career" to developing C-64 and VIC-20 software and input and output devices for the handicapped. Don will send you his disks for only $3 each, and he's donated the programs to QuantumLink for downloading. His address is 2645 E. Southern, A326, Tempe, AZ 85282, or you can call him at 602-831-3519. See also "The Speech-Controlled 64," by Kent Patterson, in the June '87 issue of* RUN.

You might also contact distributors of public domain software—both user's groups and commercial enterprises. RUN *has published lists of such distributors in the past and hopes to include an expanded and updated list in an upcoming issue. We encourage purveyors of public domain software to send us their names and addresses, and to mention specifically if they have programs for the handicapped.*

As for a magnifying screen overlay, does anyone know of such a device?

—EDITORS

PLAYING GAMES WITH THE C-128

The C-128 has the power to be a great game machine, as well as a productivity machine. At first, I thought 80-column hi-res graphics wouldn't be possible on the 128, but *RUN*'s Ultra Hi-Res Graphics (February 1986) and Patech Software's Basic 8.0 have changed that.

There are only two C-128-specific games currently available that I know of—Infocom's Trinity and Bureaucracy, both of which are text adventures. Once I saw an Apple II version of Electronic Arts' adventure The Bard's Tale. The program was designed for 64K, but it also had an option to expand the scenario and landscape if you had 128K.

Why can't publishers do this for the C-128? They couldn't put the enhanced version on the back of the disk, because the 1571 drive has trouble reading the back side. However, they could include it on a separate disk. This attractive feature probably wouldn't price the program out of sight (I expect I'd pay $5 extra for it), and it would make C-128 owners happier with their purchase.

—MATTHEW WEBSTER
KEYMAR, MD

Infocom has certainly made a start, and Access Software recently announced a C-128 version of Echelon. We also understand that a C-128 version of SubLogic's Stealth is in the works, and rumors are circulating that other C-128 games are being developed as well.

—EDITORS

Q-LINK RESERVATIONS

When you recommend QuantumLink to Commodore users, I believe a certain caveat is in order. After joining, if you don't access the network during a calendar month, they still bill you the $9.95 monthly fee. According to their spokesperson, they consider Q-Link a service, which you pay for whether you use it or not. As I've discovered, the only way to get rid of the monthly charge is to cancel membership.

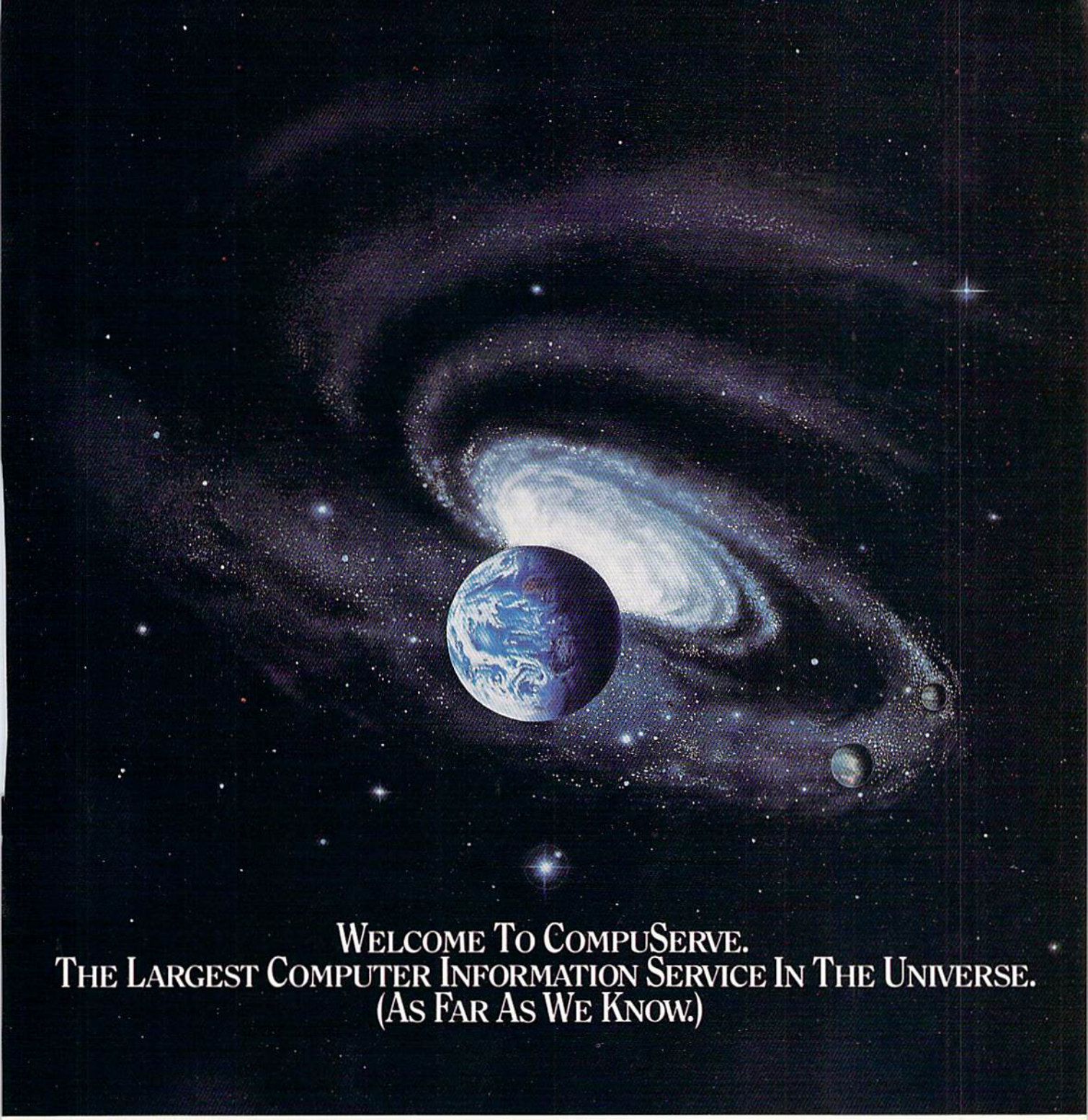
—MICHAEL SCHETTLER
RESEDA, CA

We've received other letters this past month pointing out that many of the services offered on Q-Link incur plus time and that Q-Link is slow compared to other online services.

—EDITORS

GEOS QUESTION GOES UNANSWERED

GEOS products have been welcome additions to my software library, but, unfortunately, there are a number of frustrating bugs in them. Berkeley has ►



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apparently hurried these products to market without complete testing and thorough documentaion.

Even more surprising is their inadequate response when I recently contacted them with a simple formatting question about geoCalc. I was told they couldn't answer the question because the product was still new. If they can't answer questions about how their product operates, how can they expect me to buy more from them?

—KENNETH BUSH
INDIANAPOLIS, IN

RUN SCRIPT FEATURES

I must commend Robert Rockefeller and *RUN* for an excellent product in RUN Script 64. I've tried several word processors and find this one efficient and easy to use. In particular, I'm pleased that it can use all the print options on my NLQ LPrinter, an Epson clone. As an additional bonus, RUN Script 64's Define Macros feature makes defining macros as easy as can be.

—ROBERT FLETCHER
ANNANDALE, VA

MORE THAT'S WRITE FOR RUN READERS

Bob Guerra's "What's Write for You?" article about new word processors in last August's issue was enjoyable and interesting. It's good to see people trying to make Commodore programs less stubborn and more versatile—sometimes successfully. The days when you needed to count your word processor's legs to see if it was a computer program or a mule may finally be past.

Some of the programs you reviewed sound pretty good, but others that have been around longer may be better. PaperClip, for instance, offers macros, which none of the "new" programs you reviewed do.

—JOOST VAS DIAS
WHITE PLAINS, NY

It's my opinion that Bob Guerra gave poor consideration to Timeworks in his August review of word processors. He reviewed their Word Writer 3 software, which is a C-64 product, instead of Word Writer 128, when many of the other programs were reviewed in their C-128 version. I've used Word Writer 128 for more than six months and have found it to be excellent in the features used for comparison in the review, as well as in specialty features such as the Thesaurus and Dictionary. Also, it lets me incorporate data from Data Manager 128 and Swiftcalc 128.

—R. J. ARCHAMBAULT
PHOENIX, AZ

We asked Bob Guerra to review Word Writer 3, because it's the latest version of the program on the market, and the goal of the article was to cover the latest. However, we're glad you've written to tell other readers about Word Writer 128.

—EDITORS

A CALL TO READERS

Send your letters to Mail RUN, 80 Elm St., Peterborough, NH 03458. Each letter must include the writer's name and complete address. RUN *reserves the right to edit letters for style, clarity and space.* ■

RUNNING AROUND THE WORLD

In last July's Mail RUN column, we intitiated a feature called RUNning Around the World, in which we periodically publish the names and addresses of readers who'd like to correspond with a Commodore user in another state or another country. Since then, we've received letters from more readers, from various countries, who would like computer pen pals. Write to one of the folks below, and you're sure to broaden your horizons.

If you'd like to be listed in RUNning Around the World sometime soon, drop a line to Mail RUN. Make sure your name and address are readable, and mention the machines and computing activities you're particularly interested in.



Canada:
Lucien Gravelle
PO Box 373
Lazo, BC
Canada V0R 2K0
C-64; telecommunications

Lee Brian Hutchison
846 Clifton St.
Winnipeg, MB
Canada R3G 2Y1

Malaysia:
Calvin Cheah
PO Box 1032
Penang 10840
Malaysia
C-64, C-128; CP/M

Mexico:
Esteban Quijaro B.
Barcazas #115
Fracc: Jose Colomo
86100. Villahermosa, Tabasco
Mexico
C-128; programming, games

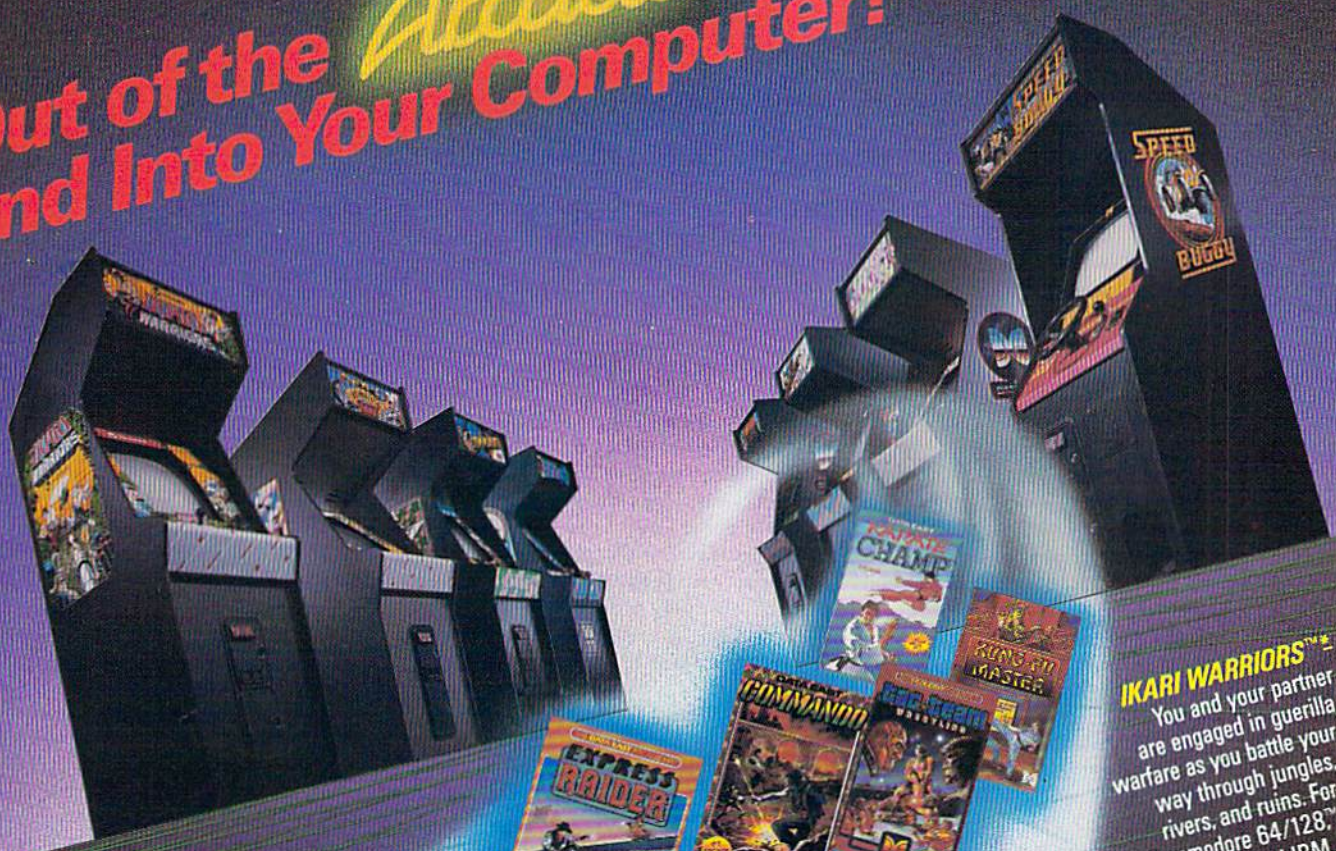
United States:
Linda Nelsen
9599 Brayton Drive #500
Anchorage, AK 99507
C-64, C-128; word processing to games

Judah D. Hill
549 E. McKellips Rd. #89
Mesa, AZ 85203
C-128; public domain software

Sterling Peoples
223 Melrose Circle
Tryon, NC 28782
C-64; role-playing games

Leonard Arnold
Route 1, Box 33
Gladstone, VA 24553
C-64; games, programming, telecommunications

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SOFTWARE GALLERY

This month, we have graphics programs to tickle the creative funny bones of young and old alike, educational software for the elementary set and etiquette software for the adult social set!

Compiled by BETH S. JALA

BASIC 8.0 ..... A

This New Graphics Language Taps the Potential Of Your C-128!

Basic 8.0 is a graphic illustration of the fact that the C-128 really *can* be programmed to run high-resolution color displays on its 80-column screen. Adding 53 commands to the C-128's built-in programming language, Basic 8.0 provides your computer with what the developers call "the most powerful and productive graphics system ever developed for an 8-bit machine." Sound impressive? It is.

It's also especially good news for all those graphics devotees who felt a little cheated to discover that Commodore intended for the C-128 to only display hi-res graphics with the VIC chip, which operates exclusively in 40-Column mode.

Addressing that shortcoming, the same authors of the 80-column monochrome graphics program, Ultra Hi-Res, turned their talents toward making the C-128's powerful 8563 chip easily accessible to Basic programmers.

Without slowing other Basic operations, Basic 8.0 gives you the code that Commodore left out by installing a machine language wedge and a patch in the C-128's syntax error routine. The patch checks for the ampersand (@), which precedes every one of the 53 new commands. If the apparent syntax error begins with an ampersand, it's passed to a separate Basic 8.0 interpreter for processing. This efficient approach doesn't affect the speed at which the C-128's regular interpreter processes Basic commands.

Totally compatible with Basic 7.0, Basic 8.0 lets you program 80-column graphics at a resolution of 640 × 200 pixels, twice that of the C-128's 40-column screen. Basic 8.0 features one monochrome and four different color display modes. All have a bit-mapped density of 640 × 200 screen pixels but vary with regard to color resolution.

The mode you select determines the size of each color cell—the group of pixels that share the same foreground and background colors. Cells can be as small as 8 × 2 pixels or as large as 8 × 16, with two other sizes in between. Naturally, the smaller cells give the greatest color resolution. In addition, Basic 8.0 lets you display all 16 colors on the screen at the same time, in any of the four color modes.

As you might expect, these high-density screens require a large amount of memory. A single Mode 2 image consisting of 128,000 pixels with 8000 associated bytes of color information requires almost 24K of random access memory for storage. To store these screens, Basic 8.0 doesn't steal space allocated to program memory, expecting instead to find 64K screen memory chips serving the 8563 video display processor. At this writing, only Commodore's 128D machine is delivered to you with 64K of screen RAM already installed.

Since most C-128s were built with only 16K of screen RAM, you might conclude that the great majority of these computers can't handle even a single 80-column hi-res image. That's not the case at all: Basic 8.0 will run just fine on any C-128. You are, however, restricted to creating graphics that will fit within the existing 16K screen memory. If you elect to upgrade your C-128 to 64K, you'll be able to store multiple 640 × 200 images in screen RAM as well as create virtual screens that are so large they can't be viewed without scrolling.

While the display capabilities are impressive, they don't even hint at what the entire Basic 8.0 package can do. The single unprotected disk contains three independent modules—the extended programming language, a run-time module and a comprehensive drawing program. In addition, the authors provide utility programs to convert images created with their earlier effort, Ultra Hi-Res, as well as standard 40-column fonts to a format that Basic 8.0 can read.

As a programming language, Basic 8.0's commands introduce entirely new ways of creating, storing and manipulating high-resolution color images on your C-128. The program establishes a graphics system that utilizes structures, a term that applies to almost any pattern, design, font or instructions that you create and store for later use, even within another program.

You can define two-dimensional and color patterns. Under program control, Basic 8.0 will make multi-drawn images by incrementing the height parameter of a structure. You can even use this extended language to enter the world ►

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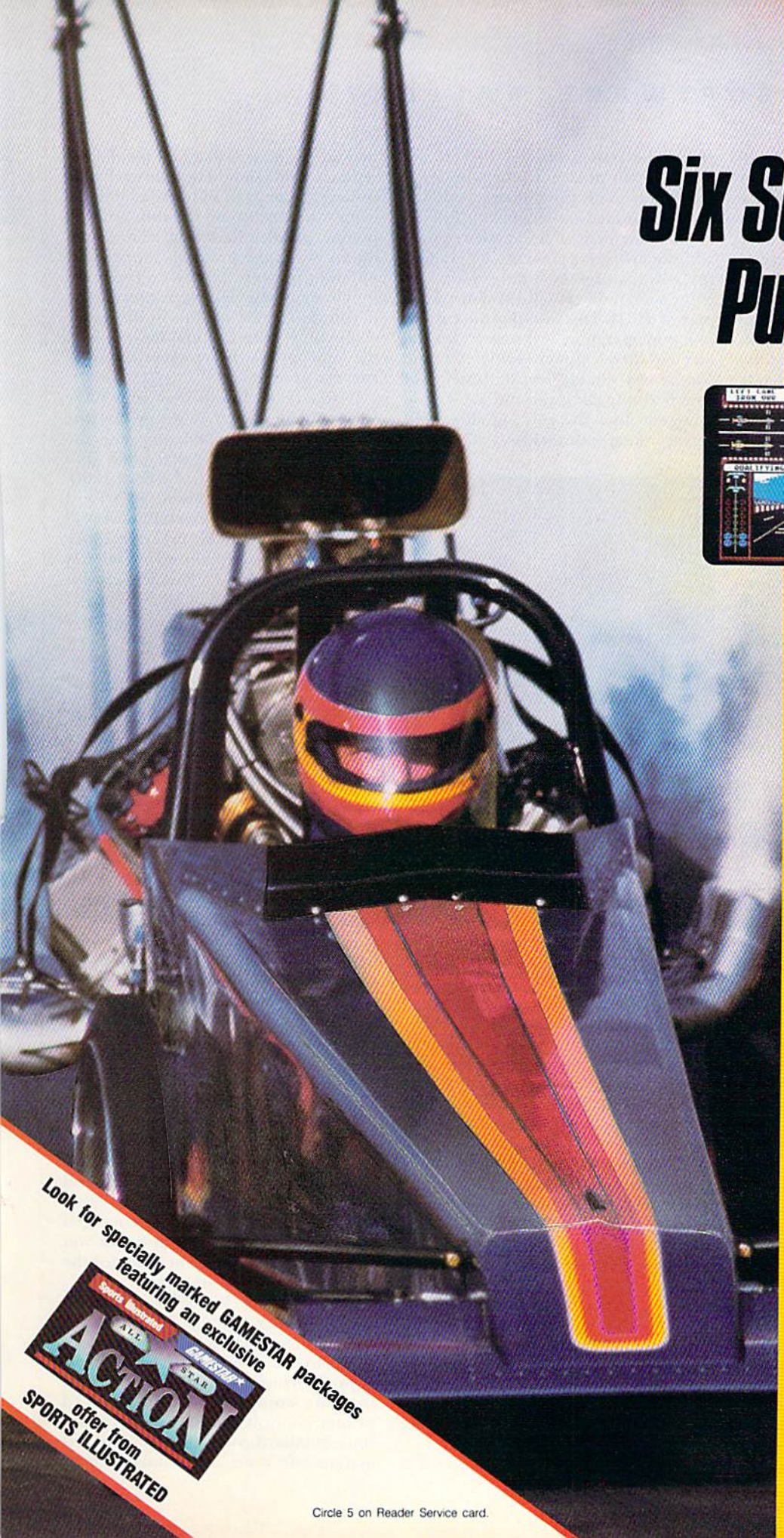
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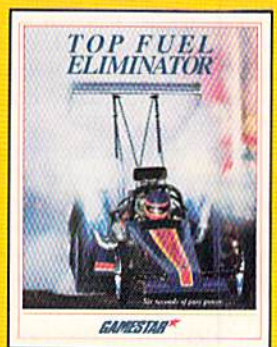
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of three-dimensional imagery. Basic 8.0 provides an environment within which you can control perspective, rotation, viewing angle, origin and depth of view.

The excellent user's manual explains each new command and offers several sample programs to get you started programming in Basic 8.0. Commands include @Stash, which lets you store several graphic screens in RAM banks 0 and 1; @Scroll, which moves the image in any of eight directions; @Hcopy to send screen graphic displays to your printer; and @Font to assign the character sets available in Text mode.

Other commands that are new include @Windowopen to open a window within which Basic 8.0 can continue to work; @Flash, which reverses the image; and @Zoom to enlarge a previously stored graphic to the screen. The @Scale command even allows for program-controlled compensation for nonsymmetrical pixel shapes.

To ensure that a program written in Basic 8.0 will run on any C-128, the authors supply a run-time system that can be given away or even sold by registered Basic 8.0 owners. This means that you are free to share or sell programs created with Basic 8.0 without paying additional fees or royalties. The compiler includes Workbench, a slick graphics interface that autoboots, controls up to four disk drives and lets users easily enter your program(s).

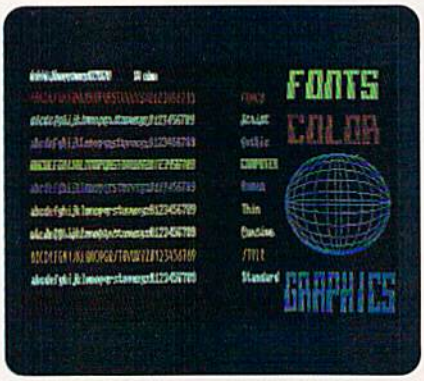
Another part of this package is Basic Paint, a stand-alone drawing program that lets you access a host of drawing functions in any of the five Graphics modes. A wonderful tool for creating screens and patterns that can be used by any Basic 8.0 program, Basic Paint is reason enough to buy the whole package.

Controlled by mouse or joystick (although I recommend the 1351 mouse), this comprehensive program for painting electronic pictures also takes full advantage of RAM expanders with high-speed screen storage and provides an image lock to prevent accidental erasure of your work. Drawing functions available at the click of a mouse include zoom, cut and paste, erase, freehand draw, lines and fill.

Basic Paint is a fun program that lets you automatically create boxes, circles, ellipses and other polygons that can be integrated with multiple-type fonts of adjustable size and proportion. A grid can be superimposed on the screen as an alignment aid when cutting and pasting.

Incidentally, Basic Paint is the first program I've used that demonstrates "mouse flicker," a problem apparently peculiar to certain 1351 production runs. The screen pointer flickers annoyingly but does not otherwise seem to interfere with program execution.

As mentioned earlier, making full use of the potential of Basic 8.0 requires additional screen memory. Upgrading to 64K requires swapping your machine's 4416 or 4164 RAM chips for a pair of 4464s. This would ordinarily be a simple operation, if it weren't for the fact that these chips are soldered to the computer's circuit board. Instead of simply unplugging the old RAM, you must unsolder the existing chips and replace them with sockets.



Eighty columns, a variety of fonts and so much more at your fingertips with Basic 8.0.

While plugging in the new chips is child's play, the soldering is best left to an experienced technician. Even so, the upgrade shouldn't cost more than $50. Remember that opening the case of your computer voids the warranty. You might want to wait until the 91st day before you make this change.

Also, since hi-res color graphics have heretofore been restricted to the 40-column screen, many users have been getting along fine with a composite color monitor. Lacking an RGB monitor when Basic 8.0 first arrived in the mail, I was dismayed to discover that I couldn't even see Basic Paint's critical configuration screen when I connected a monochrome monitor to my C-128's 80-column side.

Although the manual doesn't mention it, a simple modification to your 80-column monochrome monitor cable gives you sharp and clear images until you take the plunge and invest in an RGB monitor. Just open the cover of the nine-pin plug and carefully solder a jumper wire between pins six and seven. This adds the intensity signal to the monochrome video signal, allowing the Basic Paint screens to be seen.

My only complaint with Basic 8.0 is that there's no way to adjust the default settings. Users should be able to change the screen colors of Basic Paint and run it on a monochrome monitor without pulling out the soldering iron. In addition, while the program supports 11 different printers, there's no provision for changing the default printer driver. If you don't have an Epson or Epson-compatible printer, you'll have to load the appropriate driver every time you run the program.

If you really fall in love with Basic 8.0, you'll be happy to know that the program is also available on a user installable chip ($19.95) that plugs into the empty socket in your C-128 or 128D.

Sales of Basic 8.0 should be brisk. I suspect a lot of graphics enthusiasts will want Basic 8.0 available every time they turn on their computer. *(Distributed by Patech Software, Inc., PO Box 5208, Somerset, NJ 08873; C-128/$39.95.)*

—JOHN PREMACK
LEXINGTON, MA

WordPro 64 with Turbo Load and Save ..... B+

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After you insert the cartridge (which works with many other programs) and disk, the WordPro 64 word processor with Spinnaker's new Turbo Load and Save package loads in 17 seconds. The program and corresponding files load and save at five times the normal speed.

The disk comes with the word processor and spell checker on one side and the SpellPro dictionary of 100,000 words on the other. You're encouraged to copy the unprotected disk, but you must have the cartridge in order for the main program to work.

After loading WordPro, you must load a printer module. The program supports 25 different printers. Chances are, yours will work with one of them.

WordPro uses combinations of keys to issue commands and to imbed printer controls in the text. There are some standard codes like "lm" for left margin and some non-standard codes ►

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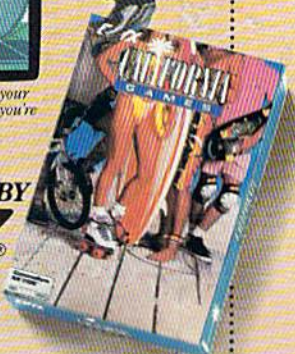
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like "pp" for page length. A checkmark begins all code lines. All the terms are listed on one page of the manual.

WordPro 64 has all the traditional features of most word processors: margin settings, line spacing, insert, erase, and copy blocks, to name a few. But, WordPro can do much more. For example, you can link text, search and replace in memory or through the linked text, print out in different lettering styles, align columns on your sheet, print in two columns, make form letters and print your own graphics. After saving a completed document, you can swiftly check your spelling from within the main program.

However, there are some shortcomings with WordPro. While the manual is well organized, I found myself searching through the booklet on a number of occasions. Many of the commands and imbedded characters are not easy to remember. Plan to make a cheatsheet and keep it nearby.

You should expect to take some time to learn WordPro 64. I found several sample disk files to be very helpful in this process. This isn't a child's toy, but a sophisticated package for the serious user. WordPro 64 with Turbo Load and Save is a good value for the money and the package is highly recommended. *(Spinnaker Software, One Kendall Square, Cambridge, MA 02139; C-64/$39.95.)*

—SAUL COHEN
AMBLER, PA

TEDDY BEAR.RELS OF FUN ..... A

This Easy-to-Learn Drawing Program Keeps Kids Entertained for Hours

Teddy Bear.rels of Fun is by far the easiest way to draw graphics on your C-64 that I've seen in a long time! It's designed for use as a learning activity, but can also be used by children to easily create their own pictures. This program is excellent for teachers and classroom settings, and should be kept in mind by parents searching for educational, yet fun and entertaining, activities for their children.

Included with the program is a booklet that contains 100 activity ideas. Suggestions cover creative art, math, logical thinking, language ability, basic science and social studies. In fact, adults will breathe a sigh of relief when setting up teaching aids with this software: Even if you have no artistic ability, you will find that you're able to generate excellent drawings!

The package's two single-sided disks store libraries of sketches for use in your pictures. The artwork is excellent—the sketches are simple, yet colorful and appealing. The colors on the screen are sharp and distinct, and don't run into each other where objects meet. You can overlap objects and the color of the front object will take precedence, which is great for teaching spatial relationships.

The color combinations of the objects are one of the program's outstanding features; there has clearly been a lot of artistic energy put into the manufacture of this program. Different backgrounds and borders are supplied, as well as the ability to insert captions and a choice of eight typefaces.

The user's guide is well written and clearly organized. Each disk is labelled to make getting started simple and easy.

There's a section in the user's guide that illustrates the sketches that are stored in the disk libraries. One quick look and you immediately know which disk and library contains the sketch you want. In fact, the program runs so smoothly and simply that you should have no trouble following the prompts and will only occasionally need the guide for reference.

The drawing procedure begins with choosing a background, then choosing stick-ons that are cut-outs of various objects to be placed on the background and moved around. If you don't like where you put it—erase it! It's simple with just a few keystrokes and clear, well-written prompts. Captions can be edited before final placement.

When you're done, you can save your creation to disk or print it out. If you forgot to format a disk before you started, don't worry—the software does it for you from within the program. If you forgot to switch a disk, the program alerts you with a picture of a disk drive and a bell.

Your final picture can be printed as a label, a poster in two sizes or as a picture with or without shading, in case you'd like to have an outline that you can color in later.

If you have a KoalaPad and Koala-Painter, you can combine those drawings with Teddy Bear's sketches. You can also automatically display a series of ten pictures with the electronic slide-show feature. In addition, the software is compatible with Epyx' Fast Load cartridge.

Both adults and children will enjoy this software. While the children are using it, they're having fun and learning at the same time! All in all, a superb product! *(DLM, One DLM Park, Allen, TX 75002; C-64/$39.95.)*

—EDITH CHASEN
WOODHAVEN, NY

RSVP ..... B-

How Would Your Manners Rate If You Were Invited to Dinner at the White House?

Almost all competitions require certain basic skills. In hockey, skating is essential. In polo, horsemanship is a must. And in the quests for business and social success—the real-life situations that most people actually compete in—acceptable manners are mandatory.

RSVP explores the role and effects of etiquette in a variety of settings. In addition to its basic game scenario, the software offers a practice mode. Its "international" section lists 18 countries as choices. There are also 17 "national" categories, with features ranging from "business meals" and "correspondence" to "parties" and "weekend out."

Approximately 20 multiple-choice questions regarding manners and social behavior are available for each subject. Many questions are very concrete; for example, how snails should be eaten



RSVP presents some competition to Amy Vanderbilt for etiquette rights!

without snail tongs. Others are more subjective and thought-provoking, like what type of recommendation letter is appropriate for a colleague about whom a businessman has mixed feelings. The face of a supposedly well-mannered individual appears on the screen with each question. A change in his or her expression indicates whether the response is correct.

The Game mode offers a selection of eight different career paths. Among ►

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them are global banking and U.S. journalism and politics. To win, the player must correctly answer a high percentage of questions, including some about characters and situations that were previously encountered. While the program furnishes positive progress reports when the game is going well, it also announces the decline of a career when too many errors are made.

The software does have some minor problems. A few typos cause confusion at times. Also, some players may not agree with the "proper" responses to some of the more abstract questions. In addition, if someone is interested in only a few of the practice categories, he or she will soon know the answers to all of their questions.

However, the program more than makes up for its limitations. Its best feature is its humor. A number of rather odd alternative responses to the multiple-choice questions and some of the facial expressions indicating incorrect answers can be very amusing.

Though RSVP does have educational value, most players will enjoy it as a pleasant, low-key recreation. It should appeal to individuals who are interested in the way they present themselves in social situations. That audience, of course, could include practically everyone. *(Blue Lion Software, 90 Sherman St., Cambridge, MA 02140; C-64/$29.95.)*

—WALT LATOCHA
OAK PARK, IL

VIDEO TITLE SHOP; GRAPHICS COMPANION ... C+

Imagine the Titles You Can Create for Those Old Family Movies!

If anything is more popular than home computers it would surely be VCRs. Now you can put your Commodore to work making pictures for your videotapes.

The computer to VCR connection is fairly simple: It can be done in one of several ways and is no more difficult than connecting an outside antenna.

Video Title Shop is a tool that lets you create one or more video slides or title screens to enhance your home video tapes. Or, can you use it to create attractive displays for your business or civic group. The Graphics Companion disk (sold separately) provides you with 16 pre-drawn backgrounds to ease the creation of individualized screens. Video Title Shop only comes with two backgrounds.

You'll find a 48-page instruction manual to master, plus an addendum and several other inserts. It seems that after printing the manual, Datasoft made some program changes and realized that some items were not clearly explained. Initially, I still found it difficult to maneuver through the program.

But, looking at the features first, Video Title Shop consists of two main portions. The Video Titler section is where the action takes place. Micro-Painter Plus is a drawing program that you can use to create your own back- ►

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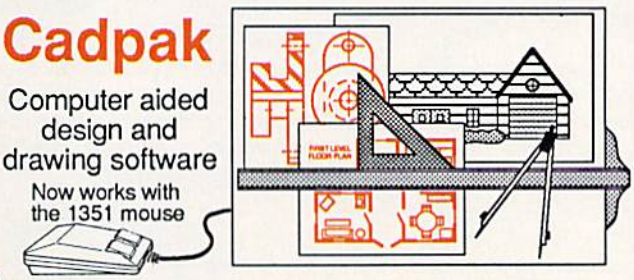
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grounds. It is adequate as drawing programs go, but I prefer several of the other commercial products.

Video Titler lets you choose predrawn backgrounds and place text on top of them. You have your choice of fonts, colors and pen strokes.

Multiple pages are available to make it easy to sequence your creations. You can then use a variety of title effects to move from one picture to another.

To create an entire video sequence, you must select the pictures you want to use, create a sequence file and save them all on a single disk if you wish to use them again in the future.

The end result can be a very attractive video sequence that'll greatly enhance your video tapes. However, getting the results you want is going to take a lot of time and patience.

Video Title Shop uses a sometimes confusing series of terms and keystrokes to get the job done. For example, selections are finalized by pressing the run-stop key rather than return. Say, for instance, that you want to place some large letters on a blank background. First you press Commodore/F to select the font. You choose the font you want by using the cursor up-down key and pressing run-stop. To select the color of the font, you press Commodore/C, once again scrolling through the available colors, using the cursor up-down key.

To finally enter the text, you press run-stop again, then Commodore/E. Once you've entered your text, you'll also have to remove an obnoxious asterisk at the end. It's not difficult, but it does take extra keystrokes.

The rest of the features are just as awkward to access. Incidentally, the manual constantly refers to tasks and objects. They're explained, but why make it so difficult to begin with?

On a positive note, you can import pictures from KoalaPainter, Paint Magic, Quickdraw and Micro Illustrator for use with Video Title Shop. That greatly adds to the versatility of the program. I highly recommend the Graphics Companion disk for anyone who isn't an artist. It'll give you some beautiful backdrops covering most major and annual events like Christmas, weddings, birthdays, graduations and more.

It's important to stress that Video Title Shop does absolutely everything it claims to do. The final results are beautiful scenes with appealing effects that you can be very proud of. There is little doubt that the longer you work with the program, the easier it'll become to create the videos you want. I feel strongly that the program's features could have been made much easier to access. At the very least, a step-by-step discussion of how to create a simple sequence would have helped tremendously.

If you are a video nut and want to use your Commodore to spice up your home productions, Video Title Shop should be a welcome addition to your software collection. However, be prepared to spend some long hours learning how to get the most out of it. *(Manufactured by Datasoft; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; C-64/$29.95 Video Title Shop; $19.95 Graphics Companion.)*

—JIM GRUBBS
SPRINGFIELD, IL

STICKYBEAR MATH 2 ... A+
STICKYBEAR READING COMPREHENSION ..... D

Stick to the Bear Basics with Your School-Age Youngsters

For over six decades, grammar school teachers have distributed the *Weekly Reader* newspaper in their classrooms. It has proven to be not only a treat for students, but also a valuable learning aid.

The company that publishes the newspaper has added two more titles to its series of educational software programs, which feature a now-famous family of bruins. The first, Stickybear Math 2, continues the firm's tradition of instruction and entertainment, while the second, Stickybear Reading Comprehension, offers little in either area.

Math 2 is a sequel to the popular original Stickybear Math program, which dealt with addition and subtraction. The new software covers multiplication and division.

Math 2 begins by recording a child's name; the program can tailor lessons for and track the progress of 40 different students.

Recommended for children of ages seven and up, this program provides drills and practice sessions. The child answers problems that range from multiplying single digits by one to dividing by two-digit numbers. When a correct answer is given, a high-resolution animated scene with amusing sounds appears as a reward. At lower levels, groups of objects dance to illustrate the solutions to certain questions. The program automatically adjusts its difficulty based on the success a child has had with previous questions.

Math 2 lets parents and teachers select any one of the 37 levels that best matches the ability and needs of a particular child. An adult can also choose the number of tries allowed for a correct answer and the format required for responses. Math 2 can even issue a report card for each child.

Stickybear Math 2 is an example of educational software at its finest. Its sounds and animation will compel a youngster to continue playing and, thus, learning; its automatic reaction to a child's performance helps to avoid frustration; and its options for levels and formats are powerful tools for individualized learning. The instructions are excellent, not only presenting the software's benefits, but also indicating both its limitations and the effort that's needed for a parent to use it effectively. All in all, it's an excellent product.

Stickybear Reading Comprehension has a structure similar to Math 2. It, too, automatically adjusts its difficulty to a child's capabilities. It also offers parents or teachers the option of setting the number of tries and the starting level for each of up to 40 children.

The Reading disk contains 27 brief stories intended for children ages eight to eleven. They answer from one to nine questions on each, and parents or teachers can create as many as five of their own compositions for personalized instruction.

Reading is much less effective than Math 2. The most obvious problem is that its packaging mentions "a handy practical printout feature," yet neither the instructions nor the program itself indicates how printing can be done. The absence of a sophisticated editing function can make the individually written stories, which could have been the software's strong point, difficult to enter. In addition, a wavy scrolling mechanism and an odd lettering style cause problems when reading the text. Worst of all is the near absence of graphics. Without them, Reading offers little more appeal to children than a printed piece of paper.

Stickybear Reading Comprehension suggests that even an experienced company can sometimes falter in the demanding educational software market. However, the excellence of Stickybear Math 2 offers hope that the Reading Stickybears might learn something from their calculating cousins. *(Weekly Reader Family Software, 245 Long Hill Road, Middletown, CT 06457; C-64/$29.95 each.)*

—MARILOU LATOCHA
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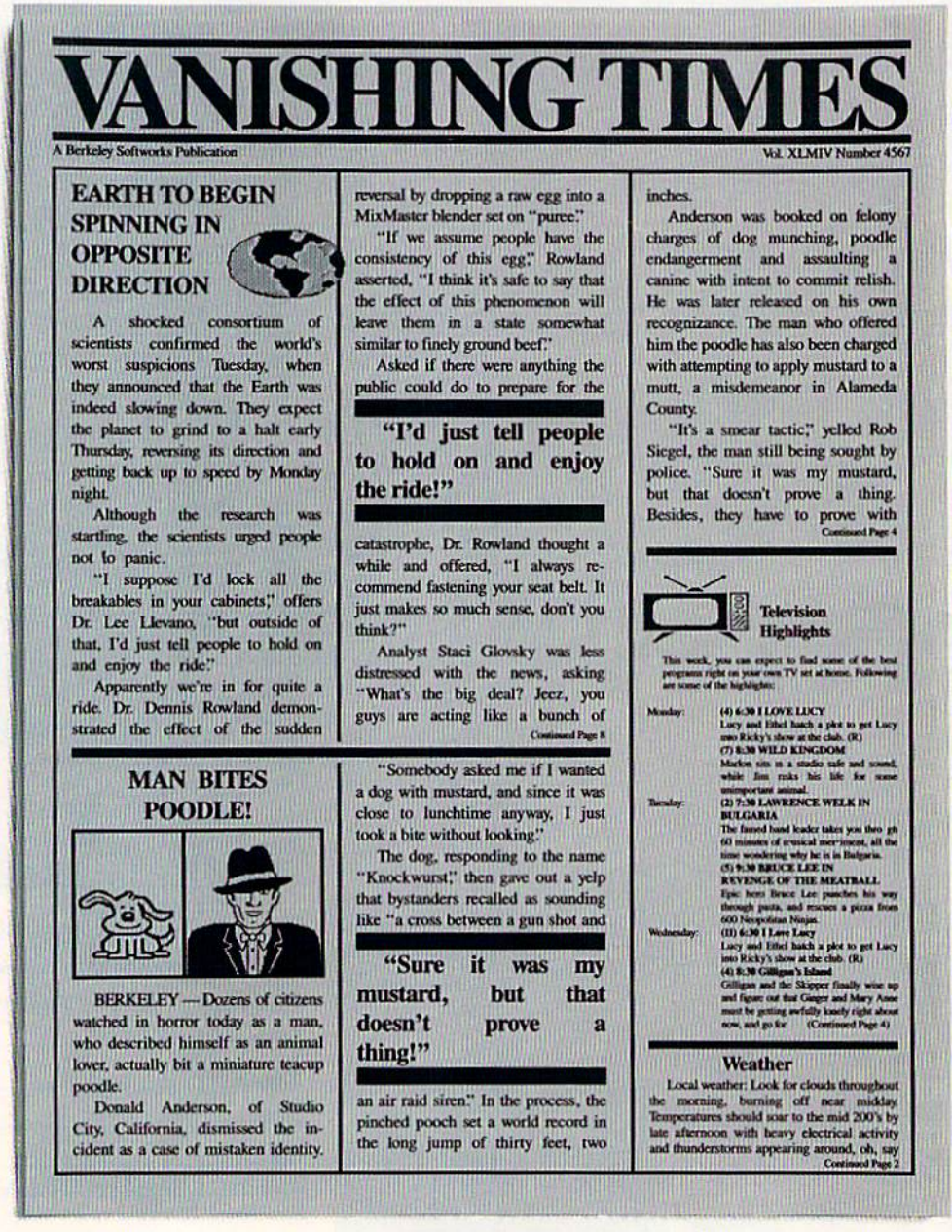
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December 3

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Weather

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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 thro gh 60 minutes of musical mer'riment, 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

Text can be printed in every font available through GEOS. These documents were printed on an Apple Laser Writer

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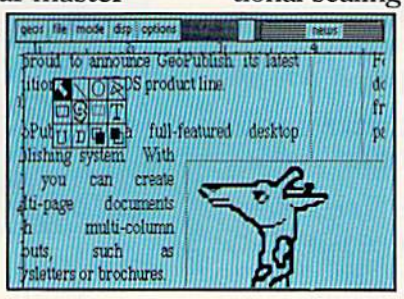
These days, the biggest story in the news is geoPublish. The page-making program for GEOS-equipped 64's and 128's that replaces lifeless layouts with page after page of powerful, punchy professionalism.

Freedom of the press.

Actually, geoPublish is very patriotic software. After all, what other application guarantees your freedom of self-expression? Well, geoPublish sure does. In fact, every piece it prints is dedicated to the preservation of your personality on paper.

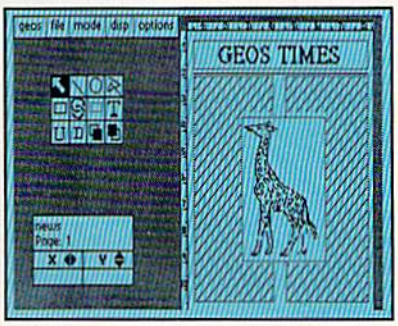
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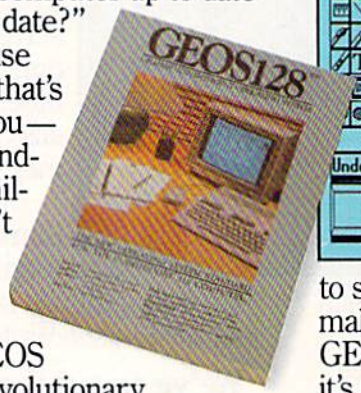
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So there you are, furiously working away at your Commodore 128, thinking everything is just peachy, when all of a sudden, it hits you. That haunting, hollow, horrible question that every computer owner must inevitably face:

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

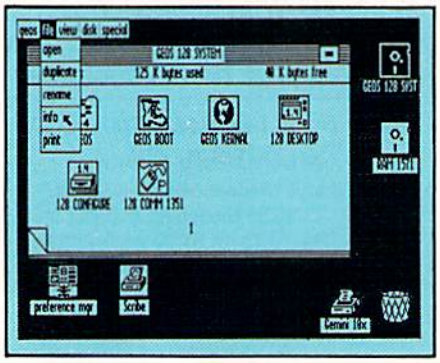
If you use GEOS 128, that's a question you—or your grandchildren's children—won't ever have to worry about.

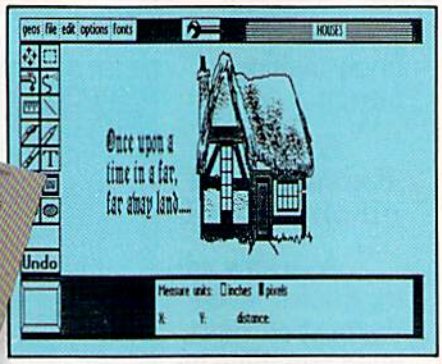


Because GEOS 128 is the revolutionary software system designed to push your hardware to new limits. Unleash its full power across a full 80 column screen. And expand its capabilities for years to come.

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 diskTurbo, 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.

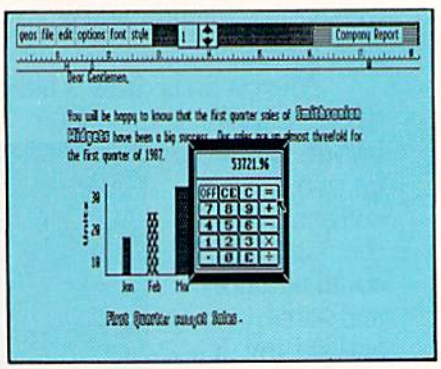
Using GEOS is ridiculously simple. All you need is a mouse or joystick, and a keen ability to point and click. Everything else is pretty much a matter of reading *menus* (a technical term for "little lists of things"), or selecting *icons* (a technical term for "little pictures of things"). It's sort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

GROWING UP ING OLD?

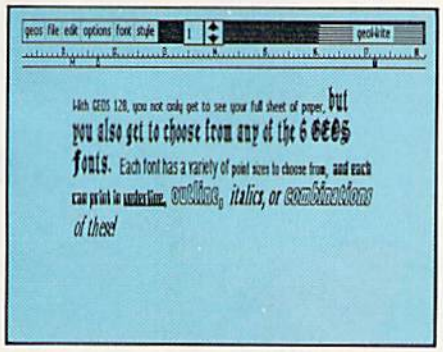
Now, we realize that's a lot to pack into one GEOS package. But as long as we're packing it in, we might as well let you know something else: There's more.

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.)

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GEOS 128



Berkeley Softworks

The brightest minds are working at Berkeley.

Circle 138 on Reader Service card.



COMMODORE

Party Animal

With the emergence of group entertainment games, your Commodore computer can be the life of your next social gathering.

By LONNIE BROWN



One Saturday this past summer, a friend of mine turned his computer room into a bowling alley. A few days before, he had purchased 10th Frame, the bowling simulation program from Access Software. He could have plopped down in front of the computer and practiced until he hit 300, then invited his friends over. But noooo. He called and said to come early Saturday afternoon.

By the time I got to his house, the neighbors were there, too, and he had divided them into bowling leagues. The snacks were out, the soft drinks and beer were on ice and the computer was hooked up to the wide-screen, rear-projection television set.

People who normally have only a passing interest in computers were actually enjoying themselves! My friend, far from the party animal suggested by this scenario, had hit upon a recent phenomenon in computer software: competition among human beings—not just man vs. machine. The party personality of your Commodore has been lurking within its beige case all along, but only lately has there been software available to draw it out.

Serfs Become Surfers

The reasons for this are varied. A few years ago, programmers were just learning what the computer could do. Then, as programming matured, so did the programs. In game software, players were given choices: play against the computer or against another player—or even a number of other players.

People who didn't own a computer often used to view both computer hobbyists and their machines as boring or suspect. The hobbyist was a loner who might very well be up to no good—tapping into bank accounts or experimenting with the mainframe at the Pentagon's War Room. Computers were either mysterious entities that wrought havoc with your charge account or something you used at work and wanted to get away from at home. However, as people have become more familiar with them, the atmosphere has changed, and now party software is turning serfs into surfers.

Keyboards and Cheese Boards

Perhaps another reason more people haven't partied with their computers until recently is that a party calls for food and drink, two things a computer doesn't need. Which brings up a word of caution: Be careful when mingling potato chips, dip and cheese boards with ROM chips, DIP switches and keyboards.

My friend's 10th Frame, golf simulations, Scrabble and other games lend themselves to group play. Most people already know the rules, and the computer can usually handicap players individually, so old pros can't automatically beat a newcomer who plays on the novice level. The controls used in group entertainment games are generally easy to master, and many games allow at least four participants. Some handle as many as eight. ►

ILLUSTRATED BY ISTVAN BANYAI

Oh, sure, you can still dig yourself silly with Boulder Dash or go on a solo hustle for Lode Runner's treasure. But doesn't it get a little lonely?

Gaming Online

"We are finding more and more people are downloading games that can be played by two or more people," says Renato Graziano, a spokesman for CompuServe. "Games that pit player against player—instead of player against computer—are becoming increasingly popular. The computer as an opponent generally plays a game the same way every time. You can detect a pattern. There's no telling what a human opponent is going to do."

QuantumLink will let you and your friends play games with people in other states. If you've upgraded to Rabbit Jack's Casino, gather around the poker table. Friends love to give advice when you're trying to fill an inside straight.

Don't forget QuantumLink's People to People connection when you and your friends are sitting around the computer, and your friends might be interested in the hodge-podge town meeting that convenes nightly in the Q-Link lobby. "The computer," says Q-Link spokesman Dan Janal, "is a great equalizer. On QuantumLink, you don't know who you're talking to."

The Name of the Game

No one at a party wants to sit around reading a 15-page manual on how to sink the Bismarck or memorize 17 joystick/fire-button combinations to play computerized football. Those true-to-life simulations are fine for computer buffs, but we're after the load-and-play games that will attract people who hate computers.

A game that turns a computer into the life of a party needs four main attributes: It should accommodate at least four players; it should be short, probably taking no more than 15 minutes and certainly no more than a half-hour; the rules should be easy; and it should let players be assigned individual skill levels.

"Murder parties have been popular in Europe for a hundred years . . . . Now they're undergoing a resurgence here."

Take Scrabble, for instance. Electronic Arts is distributing a fine computer version of this popular crossword game, developed more than 40 years ago by Selchow & Righter and converted for the computer by Leisure Genius. Nearly everyone knows how to play, but the program provides on-screen prompts for novices. Up to four can play, with the computer taking on the boring task of passing out tiles and keeping score (and, in a pinch, providing hints).

If you're home alone, you can play a computer opponent—or even three computer opponents, with each assigned a different skill level. If you don't have enough players for a foursome, the computer will gladly fill in the vacant slots.

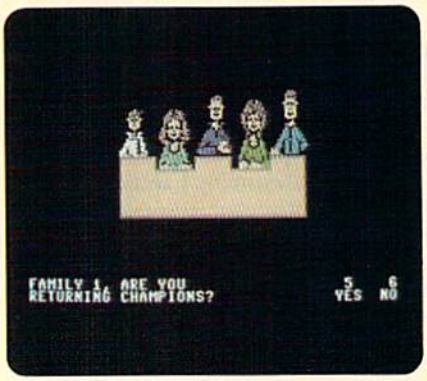
Such Trivia!

Selchow & Righter also gave the world its best-selling board game, Trivial Pursuit. Once again, nearly everybody knows how to play or can easily pick up the rules, and there are a number of computer versions on the market.

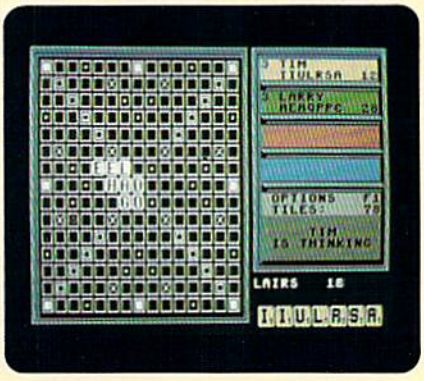
Quizam, put out by Interstel and distributed by Electronic Arts, is a version in which players can control how many spaces tokens move by timing answers. There are several game boards on the disk, and Quizam offers a rare feature for a trivia game: It lets you make up your own questions.

Suncom's Party Quiz Game comes with four controllers that plug into the joystick ports. The controllers each have four buttons, and the computer recognizes which player was first with the correct answer. Even with such sophisticated controllers, I've seen the set sell for under $20 in catalog-type stores. Some reviews of the game point out that the questions get repetitious after several rounds, but if you can pick it up on sale, this is a good buy. (A hacker friend of mine bought Party Quiz Game just for the controls.)

Professional Software, Inc.'s, Trivia Fever is probably the only computer trivia game that can be used when the power goes off—because it can be played without the computer. The game offers three difficulty levels in seven categories. With-



Survey says . . . you're on Family Feud!



Scrabble—an on-screen version of the popular board game.

out the computer, players use an inch-thick book of questions and a spinner to determine the categories. Although PSI doesn't market Trivia Fever anymore, a company spokesman says there are still many of them floating through the distribution pipeline. These, too, are available at discounted prices.

WHODUNIT?

Make Your Own Murder Party, from Electronic Arts, may transport computer partying to its ultimate: The computer literally becomes your social director, staging a party for five to seven friends. Murder parties have been popular in Europe for a hundred years, and they were once popular in the United States (there hasn't always been television, you know). Now they're undergoing a resurgence here.

In a professionally produced murder party, actors portray a mock murder, leaving clues along the way. The guests try to solve the crime by observing, asking questions and examining props.

Now, a computer can provide the script. You and your friends read the script aloud from computer-generated copies, purposely revealing some clues and withholding others, unless directly asked by another player. The computer can also print out the party invitations.

The Murder Party game booklet suggests a menu of appropriate snacks and main courses, and even includes recipes. Once all the preparations are done, the computer drops out of the picture; you don't even need to turn it on during your party.

Although there are only two basic scripts on the disk, the computer randomly assigns a player as the murderer and rewrites the script accordingly, so the guilty party changes from game to game. Even if you're doing the printing, you won't know the criminal until the plot unfolds (unless, of course, you sneak a peek at the ending).

One of the murders takes place in an upscale neighborhood (the butler did it?), while another harks back to the days of beanbag chairs and incense. If your guests dress appropriately and you don't overcook the lobster thermidor, your murder party should be an event to remember!

"You can offer your friends an evening's entertainment and send them home with . . . an analysis of their personality."

SPINNING THE WHEEL

If the people you'd like to lure into your computer room have the slightest interest in television game shows, then the trap is waiting to be sprung. ShareData has produced a well-done series of television game take-offs, including Wheel of Fortune, Jeopardy! and Family Feud.

All three are faithful reproductions of the television programs, but Wheel of Fortune is the one I keep coming back to play. As on the popular show, players take turns spinning a wheel to win money and a chance to guess the letters in a hidden-word puzzle. There are more than 400 phrases on the disk, according to a ShareData spokesman. Friends of mine have worked this program over for days without coming across the same phrase twice. The spritely letter-turner doesn't exactly look like Vanna, but she does clap her hands when the wheel spins and utter "Oh, darn!" when it lands on the bankrupt space.

Up to three can participate in Wheel of Fortune, and any noncomatose person in the house will probably want to. However, if you should be unable to find a second or third player to fill out the panel, the computer will gladly supply letter-guessers. Politely enough, they will even guess wrong letters.

The program keeps a list of winners, so high scorers can come back as returning champions. Game winners go on to the final round, in which they must guess five consonants and a vowel to solve the puzzle within 30 seconds.

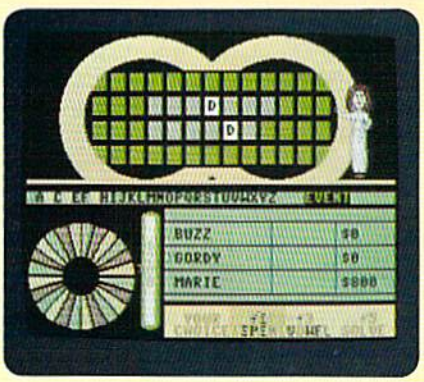
Jeopardy! can be played by up to three players. Again, the computer will supply competitors if human ones aren't available. This game and Family Feud each have about 30 sets of questions on the program disk, and you'll play many games before coming across a duplicate board. Jeopardy! questions are tough, too.

Robot Rascals, from Ozark Softscape (M.U.L.E., Heart of Africa and The Seven Cities of Gold) and distributed by Electronic Arts, weds the com- ►



This is the start of your life-long experience with Alter Ego.

Join Vanna, Pat and your C-64 on Wheel of Fortune.



puter and specially designed playing cards. Two or four players search for artifacts pictured on the cards. On the monitor screen, player-controlled robots search for the artifacts hidden on the planet Laustenfownd. Meanwhile, luck cards give the players a chance to improve their hand, or the Killer Kard may make it impossible to win. Robots can steal items from other robots by bumping into them.

The game's rules are simple, but it takes some time to play proficiently without constantly referring to the rule book. Robot Rascals is best used for a family evening around the computer or at a party where the players are familiar with the game.

Personality Plus

You can offer your friends an evening's entertainment and send them home with a two-page analysis of their personality by booting up Luscher Profile. Developed by Dr. Max Luscher, this Mindscape program is like an ink-blot test on disk—and every bit as easy to use. The seven-part test simply asks the subject to list shades of gray in order of preference, or pick which of two colors is the more attractive. The questions take only a few minutes to complete, and then the computer quickly compiles the answers and prints out an analysis.

For added fun, you can have everyone take the



Personal Preference lets others try to guess your likes and dislikes.

test and save the results to disk. Later, while they're sitting around hypnotized by the television, you can read the results and see if they can match each analysis with the proper person.

Mind Prober, from Human Edge Software, produces a similar report, but it uses a different method to come up with the analysis. You pick a person to evaluate, then have him or her leave the room while the other players go through a list of about five dozen adjectives and answer "agree" or "disagree." The result is usually a pretty accurate description of the person under the computer microscope—although the subject will probably disagree. After all, few of us see ourselves as others do.

"The computer can usually handicap players individually, so old pros can't automatically beat a newcomer."

While we're on the subject of personality games, Broderbund, the software people, are now putting out noncomputer games as well. Their Personal Preference is a board game in which players take turns guessing one another's order of preference among four cards dealt onto the table. The game comes with 400 double-sided cards, divided into four categories—people, food and drink, activities and potpourri—and each four-card hand comes from one of the categories. One player is "it" for each round, and the closer the other players come to guessing his or her ranking of the cards, the faster their pieces move around the board. Personal Preference has few rules to learn, and it can also be played by one person alone.

Activision puts out Alter Ego, a computer program that can take you from the cradle to the grave. Versions are sold separately for male and female players of this three-disk game. No, make that "experience." This game is really a text program, where you assume a role and make choices throughout the course of your life in that role.

If it were a movie, Alter Ego would be PG-rated. There are adult situations, including one in the male version where you meet this very attractive woman and she asks you up to her place, even though she notices the wedding band on your finger. You make the decision, and the story line continues from there. But remember, your actions may precipitate undesirable consequences.

While Alter Ego is geared for one player, there's nothing to keep several players from sitting around the computer and making decisions jointly, then watching the results. Players might take turns, each leading the character through one of the seven stages of life.

It's a tall order, but to become really engrossed in Alter Ego, you should set aside a four- or five-hour block of time to spend alone with it. You may be able to go from birth to death in one sitting, but if not, the program can be saved between the major stages of life.

At the close of an evening with my Alter Ego, I found myself making sad choices as my eyesight, hearing and health failed. At the end, when the Great Sleep came. . . well, I'd rather not talk about it. Even a jaded old adventure-gamer like myself turned off his computer feeling a bit melancholy.

Sex Drive for Your Disk Drive

As long as we're passing out movie ratings for computer games, Dr. Ruth's Game of Good Sex is definitely rated R. Surprisingly, this lively game comes from Avalon Hill, best-known for its highly realistic (but somewhat staid) war-simulation games.

Dr. Ruth figures the more the merrier, so up to seven players can be embarrassed at once. They answer multiple-choice questions about sex, relationships and love. Quick answers gain more points, and players familiar with the game



can be handicapped by assigning them a shorter answer time. Each game takes about 15 to 20 minutes to complete and includes a face-off round that pits the two high scorers against each other.

A word of caution: Dr. Ruth's questions are frank. It would be wise to go through the game a few times before asking Bob and Ted and Carol and Alice over, just to make sure things aren't going to get too personal.

So, the next time your friends get together, have them gather around the computer monitor. Tell them it's just like television, except it's interactive. If that doesn't get their attention, tell them the best part: There are no commercial interruptions.

A Word from the Sponsor

Wait! Did I say commercials? If your guests insist on an evening glued to the television, bring out The Couch Potato Game from TDC Games. This is no computer game; you play it while you watch commercials. The idea is to spot in the commercials items pictured on the cards you're holding. The game comes complete with four invitations printed on a television screen, and a final instruction suggests, "B.Y.O.B. (bring your own bicarbonate)."

When you find one of your objects in a commercial, you toss away that card. One of your cards, incidentally, is placed face up in front of you. Should a neighboring player spot that item first, he or she gets to pawn off a card on you, since you weren't watching closely enough.

There are 94 game cards, covering such commonly commercialized items as hamburgers, hats, belts, babies, wheels, soda pop and cars. The cleverly illustrated instruction booklet lists the finds that fall into the "legitimate," "stretching it" and "totally outrageous" classifications.

For example, a throw rug or carpet would be a legitimate find for a carpet card. Stretching it would be calling a doormat a carpet. And outrageous? A toupee (or scalp rug).

The Couch Potato Game, says the instruction booklet, "is not a VCR game, because we didn't charge you enough for it." To make it one, just record your own video. Doing this will also provide a variation on the game: trying to spot objects while fast-forwarding through the commercials.

This game does have some relationship to the computer: After an hour or so of commercials, the most anticomputer person in the world will be gleeful at seeing ?SYNTAX ERROR on a pale blue screen. ■

Lonnie Brown is an editorial writer and computer columnist for a New York Times-owned newspaper in central Florida.

Table 1. Manufacturers, prices and online services.

10th Frame
Access Software
#A 2561 South 1560 West
Woods Cross, UT 84087
$39.95

Scrabble, Quizam, Make Your Own Murder Party and **Robot Rascals**
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
$32.95, $29.95, $39.95 and $39.95, respectively

Party Quiz Game
Suncom
260 Holbrook Drive
Wheeling, IL 60090
$29.95

Trivia Fever
Professional Software
No longer being marketed, but still in the "distribution pipeline," often at discount prices.

Wheel of Fortune, Jeopardy! and **Family Feud**
ShareData
7400 West Detroit St., Suite 170
Chandler, AZ 85226
$9.95 each

Luscher Profile
Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
$29.95

Mind Prober
Human Edge Software
No longer being marketed, but still in the "distribution pipeline," often at discount prices.

Personal Preference
Broderbund
17 Paul Drive
San Rafael, CA 94903
$28.95

Alter Ego
Activision
2350 Bayshore Parkway
Mountain View, CA 94043
$49.95

Dr. Ruth's Game of Good Sex
Avalon Hill Game Co.
4517 Harford Rd.
Baltimore, MD 21214
$29.95

The Couch Potato Game
TDC Games
4N240 Cavalry Drive, Unit D
Bloomingdale, IL 60108
$14.95

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The Tale Of the RAM And the Mouse

Discover the available software that takes advantage of Commodore's RAM expansion cartridges and proportional mouse.

COMMODORE'S NEWEST HARDWARE options, the 1700, 1750 and 1764 RAM expansion cartridges and the 1351 mouse, make the C-64 and C-128 easier to use and more productive. Do you really *need* one of these products? Probably not, but a number of software developers are betting that once you've seen them in action, you'll *want* them. In this article, I'll describe these peripherals and survey the software being written to use them.

Commodore's RAM Expanders

RAM expansion cartridges appeal to Commodore owners conceptually. Add 256K of RAM to the C-64 or up to 512K to the C-128 and you have one humongous computer. Right? Well . . . yes and no.

Commodore's memory expansion has more in common with disk storage than it does with your computer's resident RAM. You can exchange blocks of memory between memory and a RAM expander, which isn't terribly interesting until you realize that those memory transfers, using direct memory access, occur at the rate of 250,000 bytes per second. For comparison, the 1541 transfers at about 256 bytes per second and the 1571 at about 3000.

Using demo programs found on Commodore's RAM cartridge disks, direct memory access moves a series of screens from the expander into screen memory at blazing speed. One screen follows another so rapidly that the effect is like watching a movie.

The 1700, 1750 and 1764 can all be accessed from either 64 or 128 mode on a C-128. They are visible at the same addresses in both the C-128 and the C-64, and they share the same set of instructions.

Also, all three are physically much alike. The major difference is the number of 64K memory banks each one holds. The 1700 holds 128K in two banks, the 1750 holds 512K in eight banks and the 1764 is in between with 256K in four banks. (When programming these cartridges yourself, you must specify which bank you want to store to or recall from.)

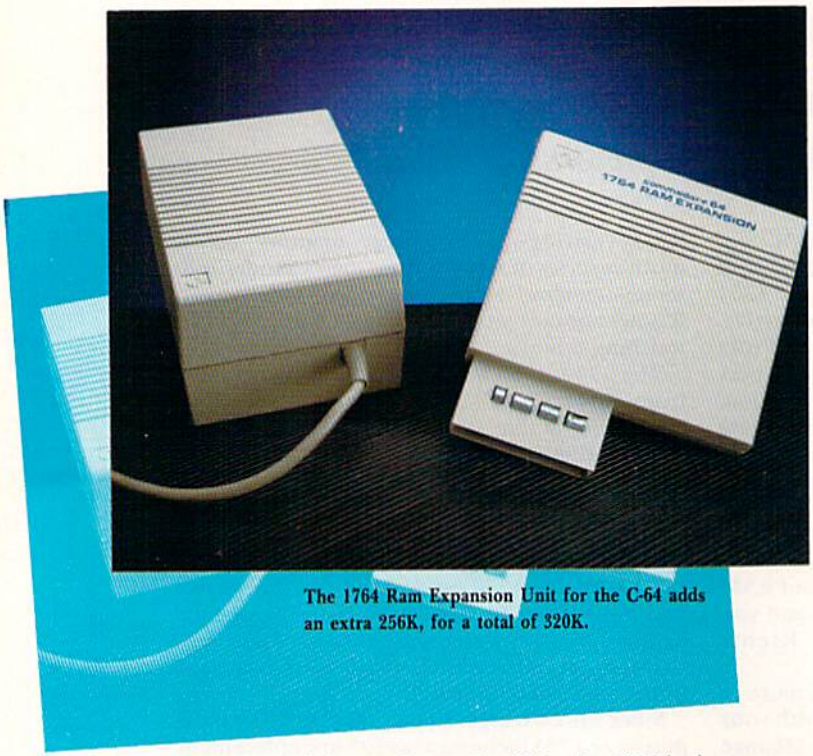
Since the cartridges share power with the computer, the 1764 includes a beefed-up replacement for the C-64's limp-wristed power supply. If you'd like a larger cartridge for your C-64 than the 1764 and you already own a beefed-up power supply, get a 1750, open the case and clip out the resistor marked R4. You can also install a switch to disconnect the R4. A knowledgeable friend installed such a switch for me, so I can use my 1750 with either a C-64 or a C-128. ►

By BARBARA MINTZ

Programming the RAM expansion cartridges is a nuisance unless you have Basic 7.0's Stash, Swap and Fetch commands. This is especially true with the C-64, which doesn't contain any commands you can use to access the cartridge from Basic. Instead, you have to write to ten different registers in computer memory via Peeks and Pokes. If you can't write your own programs to use the new cartridges, some interesting software already exists for that purpose.

RAMDOS Software

One of these programs, Commodore's RAMDOS for the C-64, works with the 1764 cartridge and comes on the demo disk with the cartridge. RAMDOS lets you assign a device number to the cartridge, so you can use it as a disk drive. "Amazing" best describes the speed at which this RAM drive performs: It will load a 100-block program from RAM disk into computer memory in about one second. It's also startling to see, for the first time, "2013 blocks free" at the end of your RAM disk directory.



The 1764 Ram Expansion Unit for the C-64 adds an extra 256K, for a total of 320K.

Unfortunately, not all programs recognize RAMDOS as a disk drive, and copy-protected programs can't be copied into RAMDOS. Also, you can't use the RAM expansion cartridge with programs that require all cartridges to be unplugged. Otherwise, the device is transparent when not in use.

RAMDOS manages to use a minimum of computer memory by using the "now you see me, now you don't" technique. The disk drive emulation program stores itself in the RAM cartridge and activates only when it's needed. Then it uses the RAM expansion's Swap command to move memory-resident code into safe storage in the cartridge, does its own job and then swaps again, putting the original program back into place in computer memory. The program does make continuous use of 255 bytes of memory starting at 52992, an area that's little used. If you need that space, you can select another address for the RAMDOS interface before installing it.

To make RAMDOS-to-disk copies, you must use Jim Butterfield's File Copy program (provided in the package), and you must rerun the RAMDOS program. Unfortunately, this solution is less than satisfactory.

There are several precautions you should heed in using RAMDOS. First, keep in mind that anything in RAM expansion disappears when the power disappears, so it's important to save files to disk often. Second, since a RAM disk doesn't have a flashing light to indicate disk errors, always check to make sure jobs have been performed correctly. Third, remember that system resets performed by some programs change RAMDOS's vectors, and some programs may overwrite its interface area in memory. If that happens, your programs and data will remain in RAM expansion, but you won't be able to access them. The only way you can get out of this predicament requires reinstalling RAMDOS in memory.

My company, Brown Boxes, has adapted Commodore's RAMDOS for use with its battery-supported cartridge, the Double Quick Brown Box. When using the Box, you can restore RAMDOS after a reset with two keystrokes, without having to reload your files. You need an extender board with extra cartridge slots to use our product, since it and the RAM expansion cartridge both occupy the expansion port.

Commodore-128 owners needn't feel neglected—Progressive Peripherals' RAMDOS 128, an English import, is available for their machine. RAMDOS 128 offers user-selectable banks and duplicates disk drive operations. Also, it can be recovered after a system reset and offers partitioning of RAM expansion memory. Partitioning lets you use part of the cartridge as a RAM disk and another part for other direct-memory-access jobs, such as the screen-switching demos I mentioned earlier. An extended Copy command permits file copying between the RAMDOS 128 disk and the disk drive.

A C-128 version of Commodore's RAMDOS should be along any day now. It'll probably be distributed through QuantumLink and Commodore BBSs and should appear in user's group public domain libraries shortly thereafter.

Applications Software

Since RAM disks don't duplicate the disk drive down to the track and sector level, nor do they respond to direct-access disk commands, most

PHOTOGRAPHED BY LARRY DUNN

commercial programs won't function with them. Such programs rely on pretty esoteric programming to speed up disk access, and even the simplest machine language programs bypass some of the Kernal routines for loading and saving, if only to shorten the program code.

Professional Software and Digital Solutions, however, have incorporated versions of RAMDOS into Fleet System 4 and the Pocket series of programs, respectively, to provide all the speed of a RAM disk.

Fleet System 4, for the C-128, uses a RAM expansion cartridge for its word processor. It accepts the cartridge as device 3 after you've accessed the program's Format function to prepare the RAM disk. Once set up, the RAM disk uses all the normal file access commands.

Digital Solutions' Pocket Writer 2, Pocket Filer 2 and Pocket Planner 2 for the C-128 automatically configure an expansion cartridge as device 2, with an empty directory listing showing 2045 blocks free with the 1750 or 510 blocks with the 1700.

For fast access, both Professional Software and Digital Solutions suggest copying their dictionary and, in Fleet System's case, the thesaurus, into the RAM disk. This makes spell-checking about 33 percent faster and thesaurus accesses easier.

Documents can be saved and loaded in a second or less using the RAM disk. Copying Pocket 2's 546-block dictionary into the RAM disk takes only about one minute, but copying those 546 blocks back to disk takes long enough to enjoy a cup of coffee.

RAMDOS applications aren't limited to RAM expansion. Several graphics programs, including Basic 8 and GEOS, can use a cartridge's direct memory access to swap blocks of data. Several public domain terminal programs will soon be able to use a cartridge for instantaneous storage of a full communication buffer, so online time isn't wasted saving the buffer contents to disk. (Although details aren't yet available, I'm told that a new version of Precision Software's Superbase will use a RAM expansion cartridge.)

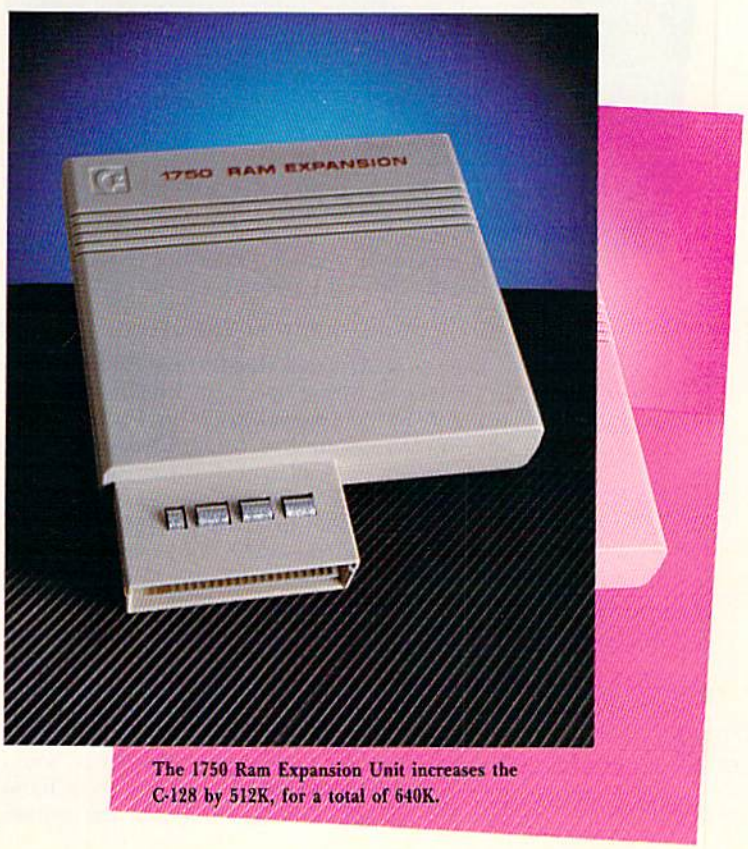
The 1351 Mouse

The 1351 is a true proportional mouse for the C-64 and the C-128, not just another joystick, as the 1350 mouse was. It's just as accurate and effective (with proper software) as the mice designed for the Amiga and the Macintosh. Pointing and clicking to specify what you want your computer to do is a natural, intuitive form of control, and it saves time you'd spend on searching through manuals for commands and typing in combinations of keys.

The 1351 inspires even more respect if you surrender to temptation and open the case. At its center you'll find a small ball resting on two metal rollers. When you move the mouse, you're actually moving the ball. Two windowed disks, one mounted on each roller, turn in response ►

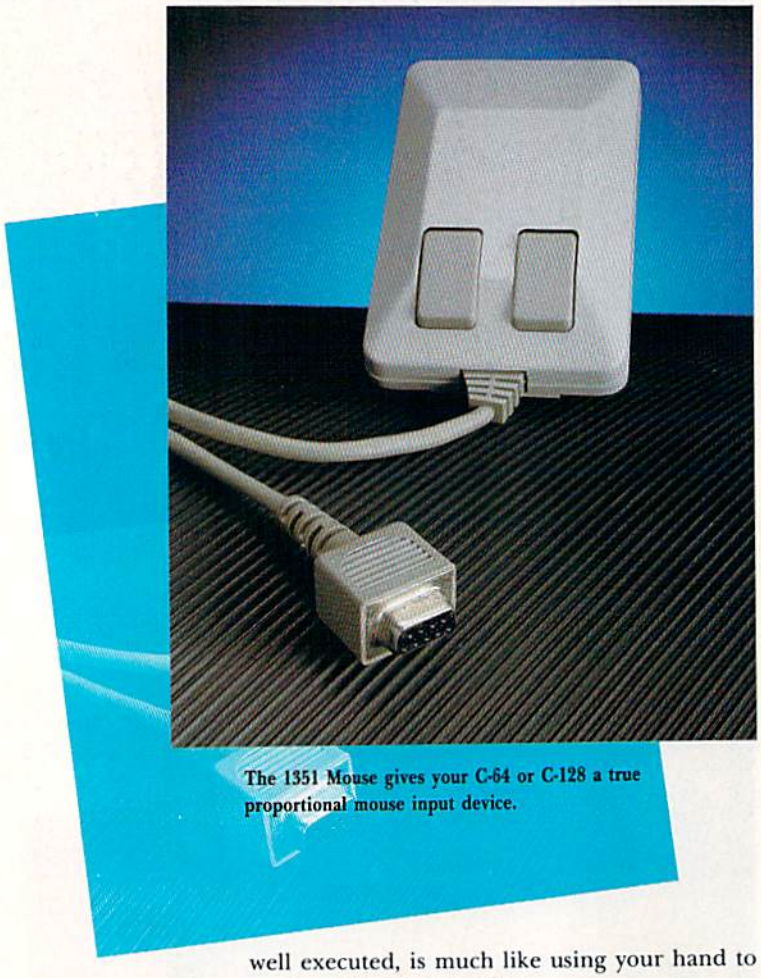


The 1700 Ram Expansion Unit adds 128K of RAM to your C-128, for a total of 256K.



The 1750 Ram Expansion Unit increases the C-128 by 512K, for a total of 640K.

to the ball's movement and interrupt rays of light emitted by tiny diodes. Optical receptors register the pulses of light, which are then translated into signals read into registers in the computer. Software that recognizes those signals positions a pointer on the computer screen accordingly. The subjective experience, provided the software is well executed, is much like using your hand to manually move the pointer.



The 1351 Mouse gives your C-64 or C-128 a true proportional mouse input device.

Software for the Mouse

Electronic Arts uses that feeling of immediacy in its Instant Music program, which should be available by the time you read this. Instant Music lets you create musical compositions by using color and line, as well as perform what Electronic Arts calls "mouse jamming."

Commodore had the foresight to build a Joystick mode into the 1351, and many joystick-controlled programs (such as the Advanced OCP Art Studio from Firebird) work nicely with it. Unfortunately, the mouse/joystick may be too sensitive for games that require moving objects through mazes and grids. If the program loop that checks the joystick switches is timed for very frequent repeats, the mouse's tiniest movements are registered as a change of direction. You'll probably find it difficult to move your hand steadily enough unless you guide the mouse along the edge of a ruler. The mouse/joystick does offer good control for games and applications requiring fast, wide maneuvers or movement in a straight line, and I expect new games and applications that take advantage of this device's unique characteristics will be appearing.

Digital Solutions' Pocket Writer 2, Pocket Planner 2 and Pocket Filer 2 support the mouse by providing pull-down windows that remain invisible unless a mouse is in use and the mouse pointer is moved to the top of the screen. The mouse performs the same functions with these programs as the keyboard does, and it's handy both for the novice and for the expert who prefers the point-and-click method of making choices.

The pull-down windows are especially helpful in creating more text area by eliminating the Help screens. For rapid editing, you can use the mouse to scroll back and forth through documents, move the cursor, mark ranges and enter commands. What's best about this arrangement is that you can either use the mouse or ignore it.

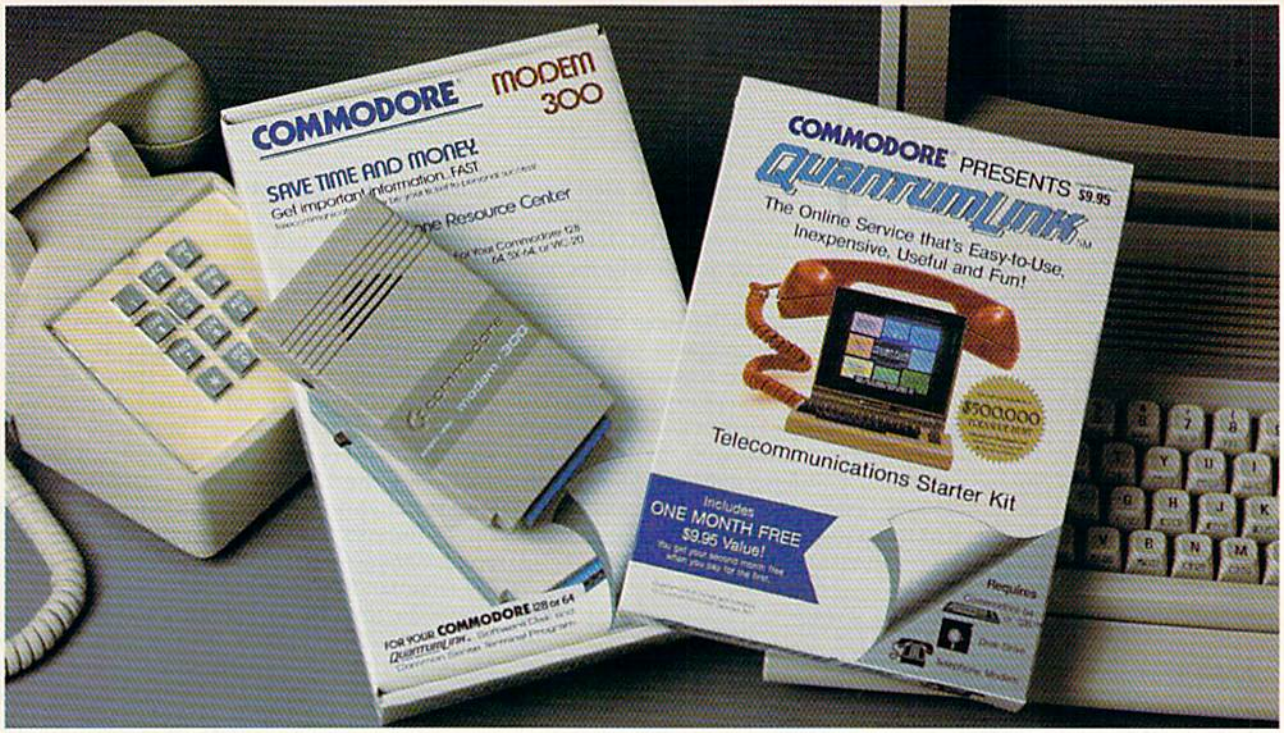
Graphics

Graphics applications that offer mouse support generally retain other forms of input, but few mouse users willingly go back to them. Not even the heralded light pen, once considered the best choice for computer-aided design, offers more accuracy, convenience and ease of use. So, it's no surprise that the Cadpak graphics program (from Abacus) and Flexidraw (from Inkwell) come in updates that support the 1351.

If Cadpak is your favorite design program, you're sure to enjoy it even more in its latest guise. New users, however, may find that some of the features that work well with the keyboard and the light pen are unnecessary and confusing with the mouse. The Accupoint function, for example, which positions the cursor, requires an extra command after the mouse moves the cursor to the correct position. Note that when you use the mouse with Cadpak, you can't use any other peripherals beyond a single disk drive, a printer and a monitor.

T.H.I.S., a C-128, 40-column graphics program, adds a mouse driver to software previously designed for a light pen. You can make one-pixel adjustments of the light pen cursor, but the mouse moves accurately and responsively without need for fine tuning. You can use the mouse to select, from a set of four pull-down windows, all the amenities you'd expect in an up-to-date graphics program. Unfortunately, if the pointer isn't centered on the word you want, you get the wrong selection. Micro Aided Designs planned to offer modular options, including screen animation, that would've had a set of function-key-selectable menus, but according to a spokesperson, they're now planning to just sell out their stock of T.H.I.S. and the light pens.

Basic 8.0, a C-128, 80-column color graphics package from Patech requires neither a mouse nor a RAM expansion cartridge, but it uses both ►



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in a programming environment—the easiest way to accommodate the language's many features. As an extension to Basic 7.0, Basic 8.0 lets you program graphics that were previously inconceivable on the C-128.

As a novice, you can use the language's 53 new commands to create color graphics on the 80-column screen, for twice the resolution of the normal 40 columns. You can create three-dimensional figures and mouse-driven programs with windows. There are commands to track the mouse, position pointers, define and control windows, and stash and fetch screen areas in the RAM expansion cartridge. Also, thanks to Basic 8.0's RunTime Module, you can freely distribute your finished programs.

Basic Paint, a hi-res multicolor paint program that comes with Basic 8.0 and uses the mouse as well as a joystick, demonstrates the power of Basic 8.0. It's the only paint program I've ever seen that has a command for creating spheres. Although Basic Paint is a huge program, it operates smoothly even without RAM expansion. However, it's better with RAM expansion present.

Power Mouse, the Mouse Toolbox, from Sumware Soft offers a simplistic approach to programming the 1351 mouse. It lets you create a "mouse environment" with up to four predefined windows for pull-down menus. The Toolbox program creates a pointer sprite and supplies the commands used in the program to track the mouse in Joystick or Proportional mode. The disk contains a Toolbox for the C-64 and one for the C-128, plus a separate utility to convert the mouse environment to Proportional mode. Power Mouse is a clever program and less demanding than Basic 8, but it requires Basic programming skills, and I find the Edit-mode windows tiresome.

GEOS, RAM expansion and the 1351 mouse seem made for each other. In fact, used together, they create a synergistic effect.

GEOS theoretically makes the C-64 a more impressive and easier-to-use machine. However, if you've got a balky joystick that has to be held in two hands, the system loses a lot of appeal. With the 1351 mouse and RAM expansion, GEOS takes off and flies. The mouse darts about with great accuracy, and the RAM expansion used as a second disk drive speeds up operation.

GEOS lets you move the contents of your work disk into drive B (the RAM disk) as if drive B were another 1541, but the speed of the transfer is remarkable. Applications pop onto the screen, and the slow, hesitant page-scrolling of lengthy documents is gone. All the data GEOS needs is now in the RAM expansion, instantly available thanks to the speed of direct memory access.

The GEOS manual claims an improvement in loading and saving speed of ten to 100 times with a RAM expansion cartridge. That figure makes the RAM expansion a pretty good investment.

If you don't need the programs that support the RAM expansion cartridges and mouse now, then perhaps you should wait before purchasing the peripherals. However, if you use any of these programs on a regular basis, you'll find that the hardware makes your work go faster and better.

As you can see, there are already many software applications available for the Commodore RAM expansion cartridges and the 1351 mouse. These programs make a Commodore computer more powerful, versatile and friendly than was thought possible only a year or two ago. If this is any indication of what the next two years will bring, I, for one, can't wait! ■

Barbara Mintz is director of the Boston Computer Society's Commodore user's group and director of software development for Brown Boxes, Inc.

Table 1. Manufacturers and prices.

1700, 1750 and 1764 RAM Expansion Cartridges
Commodore
$119.95, $199.95 and $149, respectively

1351 Mouse
Commodore
$49.95

RAMDOS
Commodore
With the 1764 RAM expansion cartridge

RAMDOS 128
Progressive Peripherals & Software
464 Kalamath St.
Denver, CO 80204
$29.95

Fleet System 4
Professional Software
51 Fremont St.
Needham, MA 02194
$79.95

Pocket Writer 2, Pocket Filer 2 and **Pocket Planner 2**
Digital Solutions
2-30 Wertheim Court
Richmond Hill, Ontario
Canada L4B 1B9
$59.95 each; Digital Superpak, $99.95

Instant Music
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
$29.95

Cadpak
Abacus
PO Box 7211
Grand Rapids, MI 49510
C-64, $39.95; C-128, $59.95

T.H.I.S.
Micro Aided Designs
215 East Orangethorpe
PO Box 345
Fullerton, CA 92632
$25 without light pen;
$85 with Flexidraw light pen

Basic 8.0
Patech Software, Inc.
PO Box 5208
Somerset, NJ 08873
$39.95

Power Mouse, the Mouse Tool Box
Sumware Soft
72 Pearl St.
S. Portland, ME 04106
$15

GEOS
Berkeley Softworks
2150 Shattuck Ave.
Berkeley, CA 94704
C-64, $59.95;
C-128, $69.95

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CBM128 512K Memory Expansion 169.00
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Curtis Universal Printer Stand 17.99
Computer Specialties Power Plus 54.99
CB128 Universal Monitor Cable 16.99

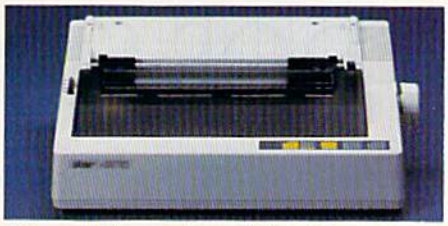
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Smartmodem 300 ..... 139.00
Smartmodem 1200 ..... 319.00
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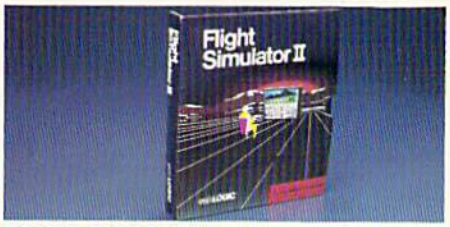
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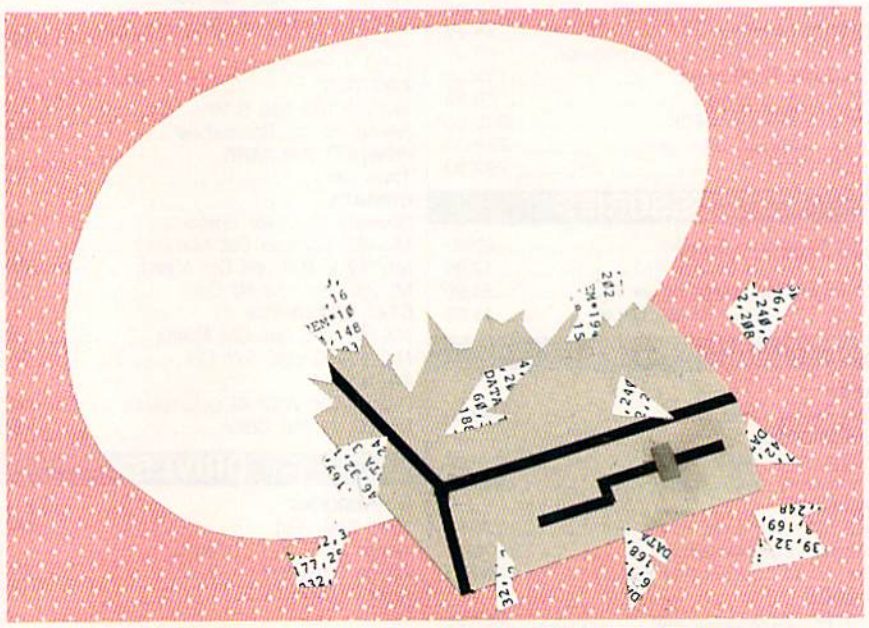
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64 DOS Shell

Now C-64 users can have the equivalent of the useful 1571 DOS Shell that C-128 owners have been enjoying for some time.

By JOHN RYAN



Commodore owners who have purchased the 1571 disk drive received with it a most useful and versatile disk utility—the 1571 DOS (Disk Operating System) Shell. Unfortunately, C-64 users were out of luck, because the 1571 Shell works only in 128 mode. My answer to the problem is a C-64 DOS alternative, which I call the C-64 DOS Shell. (For a basic discussion of the attributes of a "shell," see Tim Walsh's sidebar to this article.)

This program offers most of the features found in the 128 version, plus a few extras. Like its C-128 counterpart, you operate the 64 DOS Shell primarily with the space bar and cursor and function keys. The screen format and key functions perform almost identically to those of the 128 version, so if you're a 1571 DOS Shell user, you should feel right at home.

Preparations and Notes

The 64 DOS Shell is a rather lengthy program, encompassing almost 6K of machine language, so typing it in will take a few hours. I think you'll find the effort well rewarded, however. After typing is completed, save the data statements under any filename and then run 64 DOS Shell.

It takes a few moments for Basic to poke the program into memory, but this need be done only once. After the ready prompt, load and run the short, five-line program in Listing 2. This program compresses the 64 DOS Shell program to a small ML object-file saved on disk. Once you've done this, you can load 64 DOS Shell with LOAD "filename",8,1. Type NEW and enter SYS 34500. The program will then be installed into the operating system.

Getting Started

The 64 DOS Shell program is virtually transparent to the 64 operating system, and accessing it is as simple as tapping the restore key. Keep in mind that doing this while another program is running stops that program's execution and displays the 64 DOS Shell main menu, which appears as follows:

Disk Setup	Copy Files
Run a Program	Rename Files
Format a Disk	Delete Files
Clean up a Disk	Function Keys
Mode Selection	Directory

Use the cursor keys to move through the menu, highlighting the options. You select and execute your choice by pressing the space bar when the option you want is highlighted. Then follow the prompts as they appear. To exit the DOS Shell, press the stop key while in the main menu.

Disk Setup—The 64 DOS Shell works with either the 1571 or 1541 disk drive. Although two drives may be used at one time, dual drives (drive numbers 0 and 1) are not supported. The 64 DOS Shell uses drives "A" and "B". These are logical drives, meaning that they are controlled entirely from within the DOS Shell.

You may assign devices 8, 9 or 10 to either the "A" or "B" drive. To change the settings, simply use the cursor keys and press the space bar. After you select the second drive, the program automatically returns you to the main menu. To get there without changing device numbers, press the stop key.

Keep in mind that the 64 DOS Shell looks for a second drive, even when not accessing it. If it doesn't detect a second drive on the serial bus, strange things may occur (see Error section, below).

When using two drives, the 64 DOS Shell prompts you for the logical drive number you wish to use for an operation. Make that choice by using the cursor keys and space bar. As with most 64 DOS Shell operations, pressing the stop key returns you to the main menu or verification menu, depending on the option you are using at the time. ►

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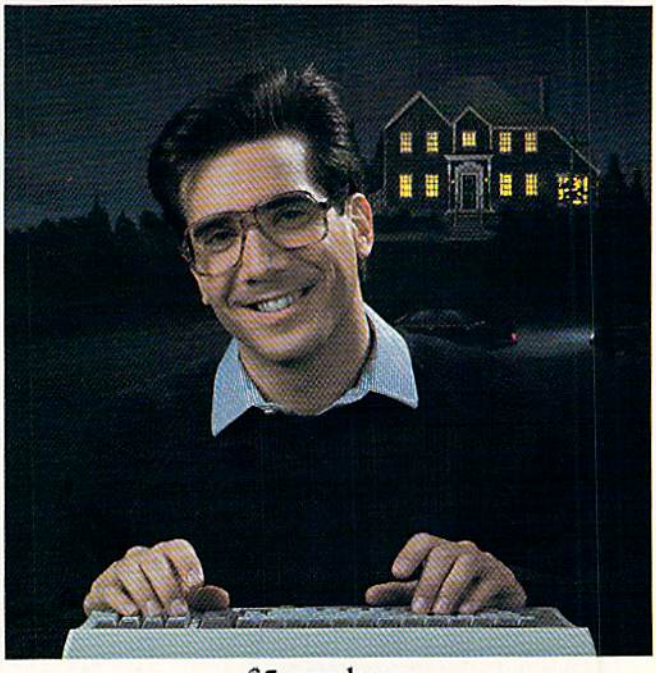
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Commodore's C-128 DOS Shell

By TIM WALSH

THE C-128 DOS SHELL is probably the best disk utility developed to date for the C-128. When you need to copy a variety of disk-based files quickly and effortlessly, rearrange files in a disk directory or restore a scratched file, you won't find many programs better suited for the job.

A Brief History

To understand a C-128 user's appreciation of the DOS Shell, it helps to know the program's background and how it works. Fred Bowen, a key developer of the C-128 who still enjoys employment at Commodore, recently related the following account of the Shell's history.

It was under development from late 1984 through early 1985, when Commodore, caught up in the excitement and anticipation of the C-128's release, was testing and refining peripherals and software to complement and enhance the computer's abilities.

Programmer Dave Middleton, under the watchful eye of Senior Programmer, Eric Cotton, was involved in writing the C-128 DOS Shell disk utility program when he abruptly left the scene at Commodore. Programmers Fred Bowen and Terry Ryan rescued the abandoned project, and by June of 1985 they had made it worthy of packaging—on a demo disk—with the new 1571 disk drive. By making this program available to every new 1571 user, Commodore shaped the way many thousands of C-128 owners view their computer.

Using the Shell

Although the background of the C-128 DOS Shell's development is interesting, it's the program, not its story, that wins friends and influences people. You'll find instructions for using it in the 1571 user's manual, but you'll only learn its capabilities and limitations through repeated use.

As mentioned above, the Shell is on the 1571's test/demo disk. It also accompanies the C-128D computer, which features a built-in 1571 drive. Although it's packaged for use with the 1571, it also works with the 1541, and I have yet to find a third-party Commodore disk drive that objects to it.



Copying files with the C-128 DOS Shell.

To activate the Shell, place the demo disk in your drive and turn your computer on; or, if the computer is already on, just type "boot" and press the return key. The program formats itself to either a 40- or 80-column screen, so it doesn't matter which mode you're in. At a length of over 17K (67 disk blocks), the program is substantial enough to keep the 1571 busy for almost 12 seconds as it loads. Once it's loaded, you're greeted with the statement, "D.O.S. Shell on F-1 Key."

Press F1 and you have seven seconds to press the space bar to select English as your language of choice for the program's menu. If you don't press the space bar soon enough, French, German and Italian options appear at seven-second intervals. Unless you can decipher prompts such as "Inserire disco nuovo e premere spazio," don't press the space bar until the program cycles back to English.

After selecting a language, you're greeted by a menu of ten disk operations—everything from validating a disk to copying an entire disk to rearranging the order of the files in a disk directory. Press F1 again and you're in Basic 7.0, just as if the DOS Shell had never been activated. All the function keys revert to their default definitions with the exception of F1, which places the DOS Shell back in service.

To see where the program resides in your C-128's memory, exit to Basic with the F1 key, then press F8 to go to the computer's machine language monitor. Next, enter "M 1900" and press return, and in the rightmost columns of the screen you'll see the words "C128 DOS Shell" and the version number you're using, followed by Dave Middleton's name. Press M <return> again to view the contents of location $1A00, which is the Shell's starting address.

Now, exit the monitor by typing "X" <return>, then return to the DOS Shell by pressing F1. Once in the Shell's menu, use the cursor keys to move about and highlight the menu choices. Unlike most menu-driven programs, the C-128 DOS Shell responds to the space bar instead of the return key when you're making menu selections, so highlight a selection and then press the space bar. When you're ready to activate the selected operation, press F7. To change your file selection, press F5, or to reset the menu, press the stop key.

Typical Applications

I typically use the DOS Shell for two purposes—copying files and reordering directories. Although I could copy entire disks sector by sector with this program, I never use that option because there's a faster way—by selecting the File Copy option and highlighting every file on the disk. In this way, in less than five minutes I can make an error-free copy of an entire disk containing a smorgasbord of Basic 2.0, Basic 7.0 and machine language program files, along with scores of word processing, database and spreadsheet files.

Copies of files can be made using one or two drives. Single-drive copies usually require only one disk swap, but there are times when two swaps are necessary.

While the C-128 DOS Shell would be a fantastic program if all it did was copy files, it's also invaluable for restoring scratched files. Just activate the Shell, put the work disk in the drive and select the Restore File option. Ninety-nine times out of one hundred,

you'll instantly retrieve a Basic program without a hitch.

Program Limitations

The C-128 DOS Shell does have its limitations. First of all, while it can copy many different files, it's not a substitute for a "disk cracker." Files that save with nary a trace of copy protection, such as Newsroom graphics, cannot be copied properly using the DOS Shell.

Next, while it can restore many types of deleted files, you'll be hard pressed to retrieve scratched program files originally created with screen codes. For example, scratch a RUN Script program file, then try restoring it with the DOS Shell. Very little, if any, of your file will be recovered.

Finally, if you press run-stop/restore while the program is activated, all the function key definitions are wiped out. When this happens, it's best to reboot the DOS Shell than to try salvaging it, unless you're sure you know what you're doing.

New Shell on the Horizon?

Commodore may have miscalculated the C-128 DOS Shell's popularity when they recently began shipping the 1581 disk drive. They were quickly swamped with protests from C-128 users who discovered that no DOS Shell existed for the new 3½-inch disk drive.

Commodore was caught off guard, primarily because of its own low regard for the C-128 DOS Shell. I'm told the program sees little use back at the home office for several reasons: because it uses the boot sector on its disk, because it resides in a section of memory popular with other programs and because it redefines the function keys.

Talks with our sources at Commodore lead us to believe that a DOS Shell for the 1581 is in the works, so we may see one in the near future. With the 128 version for a template, the result should border on perfection. R

RUN's Technical Editor Tim Walsh is a die-hard DOS Shell advocate.

Run a Program—When you select this option, the drive reads the disk directory and displays it in the directory window. You'll notice that this is only a partial listing. To display the rest of the directory, use the cursor keys to scroll up or down.

To select a program to run, move the red arrow to the desired filename and press the space bar. The filename then appears in reverse. To run it, press F7. To change the selection, press F5. (The latter two operations hold true for all of the 64 DOS Shell's selection processes.)

While this option runs *most* Basic and ML programs, you may experience problems with some ML programs. If you can't get the file to run, it probably means that the program is trying to occupy the same memory space as 64 DOS Shell.

Format a Disk—This option prompts you to input a filename for the format. As with most of the Shell's file operations, the program also asks you to verify your selection prior to formatting a disk. To format the disk, enter a header name (16 characters or less in length), a comma and a unique two-letter ID; then press return. For example: "filename", "ID" (standard format) or "filename" (short format).

By omitting the two-letter ID, you accomplish a short format that erases all files and renames the disk header. Whenever you use an ID, a full disk format will result.

Clean Up a Disk—Cleaning up a disk involves the Validate command. Once you've chosen the option, the validation begins immediately, so be sure you have inserted a disk into the desired drive.

Mode Selection—This option, for 1571 disk drive users only, allows you to toggle between 1541 and 1571 modes. This option can be useful within the DOS Shell for formatting, copying programs, and so on. The selected mode remains in effect until you reset the drives or select another mode. Use the cursor and space bar to choose the desired mode.

File Copy—This option allows you to easily copy files from one disk to another. The option works best with two disk drives, although it may be used with one. (If you're using a 1571 in 1571 mode and get a Drive-not-Ready error, set the drive to 1541 mode and try again.)

If you enter the option with two disk drives, the Shell will ask you which drive you wish to copy from. From then on, the selected drive will be the "Source," while the second logical drive will be the "Target" drive. Using the cursor, space bar and function keys, you may select one or several dozen files to copy. Pressing F7 will begin the copy sequence. Once the copy is complete, the main menu will reappear.

If only one drive is used, respond to the prompt as it asks you to insert either a "Source" or "Target" disk in the drive. The program differs from the 1571 DOS Shell at this point in that you need to format a target disk before beginning this procedure.

The 64 DOS Shell won't allow you to copy over 130 disk blocks. For files over 125 blocks, you may have to reinitialize the program. Also, the File Copy option will not reproduce relative files.

Rename Files—This option will allow you to rename a whole directory of files. Again, select from the directory listing the file you want to rename. A highlight bar appears and prompts you to enter a new filename. Do so and then press return. Repeat this process for as many files as you wish. But rename files *carefully*; duplicating a filename will result in a File Exists error.

Delete Files—This option allows you to highlight and scratch files you no longer need. Use F5 to deselect or the stop key to abort. Pressing F7 begins the scratch operation. Be very careful with this option, since you can't restore some scratched files with even the best disk-restoring utility.

Function Keys—This versatile option allows you to program any one of the function keys by assigning Basic keywords and short commands to the function keys in the same manner as the C-128's Key command. Once you're into the function key option, select Define Function Keys. Use the cursor to select the key you want to define. If that key has already been programmed, the assignment will appear in the input window. Pressing the space bar will erase the prior definition, allowing you to enter the new assignment. If the key is not already defined, you still need to press the space bar to begin entering the definition. Pressing the stop key aborts the procedure without changes.

Each key definition is limited to 30 characters, so use keyword abbreviations whenever possible to conserve line space. Once you've entered the line, press the return key or F7 to process it. Pressing the return key adds a carriage return to the definition, while pressing F7 adds no carriage return.

To enable the functions keys, select the Enable option from within the Shell. The function keys will not work until you exit the Shell program, nor will they work while you're in Quote mode. You ►

may disable the keys by tapping the run-stop/restore combination, or by selecting the Disable option. You may also "turn off" individual keys by entering the Define option, pressing the space bar and then pressing F7. This assigns a null value to the key. Function key definitions remain in effect until the program is reinitialized (see below).

DIRECTORY—This option displays disk filenames in the directory window. No selection process is available. Press the stop key to exit.

ERRORS AND OTHER THINGS

The 64 DOS Shell was designed to be as user-friendly as possible, and it will catch almost any error you'll ever make. However, to squeeze the program into 6K, I had to make certain trade-offs. A definite program-crasher is the Device-not-Present error, which causes the program to freeze up and may also garble the screen. To get out of it, turn on the drive that is not present, press the return key and then the stop key *twice* to exit the Shell. Then reinitialize the program by entering SYS 34500.

For any standard disk error, 64 DOS Shell displays the error in the message window. When this happens, you need to press the space bar to get back to the main menu. Look at the light on your drive. It will remain green (red on 1541s) until you press the space bar.

The 64 DOS Shell protects the area in which it resides; however, a large Basic program might sneak some variable storage into the Shell's program area (34500–40859 decimal; $86C4–$9F9B hex). Keep this in mind when running or copying large programs, for you may want to protect this area with the following statement:

```
10 POKE 51, 44: POKE 52, 135: POKE 55,
   44: POKE 56, 135: CLR
```

If the restore key will not reactivate the DOS Shell, try reinitializing the program.

If you encounter an error that the program did not detect, the display may scroll from the screen during directory access. If this ever occurs, press the stop key to return you to the main menu. Also, remember that once you set up the Shell for two disk drives, it will always look for the second drive, whether accessing it or not. If your screen seems to freeze up, it's a good indication that a drive is not turned on. You may reset the DOS Shell for one-drive operation by reinitializing the program.

If you do as much file maintenance as I do, then the 64 DOS Shell can save you a lot of time and effort. Have fun! R

John Ryan, an air traffic controller, is in charge of computer-based instruction for his section. An advanced machine language programmer, he is experienced on a number of computer systems, including, of course, the Commodore.

Listing 1. The 64 DOS Shell program.

```
10 PRINT"{SHFT CLR}{HOME}{CRSR
   DN}{2 CRSR RTs}IT WILL TAKE
   2.11 MINS TO READ DATA"
                          :REM*152
20 PRINT "{CRSR DN}"SPC(13)"PLE
   ASE WAIT..."           :REM*60
30 I=34500:X=0            :REM*154
40 READ A:IF A=256 THEN 60
                          :REM*44
50 POKE I,A:I=I+1:X=X+A:GOTO 40
                          :REM*160
60 IF X<> 697524 THEN PRINTSPC(
   8)"{CRSR DN}{CTRL 9}ERROR IN
    DATA STATEMENTS":STOP
                          :REM*246
70 PRINT SPC(7)"{CRSR DN}NOW LO
   AD AND RUN ML SAVER":END
                          :REM*198
100 DATA 169,8,141,200,2,141,18
    0,2,169,0,141,201,2,141,221
    ,2,141,235,2          :REM*166
105 DATA 141,238,2,162,0,157,0,
    161,232,208,250,162,196,160
    ,134,134,51,134,55    :REM*19
110 DATA 132,52,132,56,32,94,16
    6,120,169,11,141,2,128,169,
    135,141,3,128,162     :REM*38
115 DATA 0,189,7,155,157,4,128,
    232,224,5,208,245,88,96,104
    ,168,104,170,104      :REM*231
120 DATA 88,32,234,255,32,225,2
    55,208,3,76,102,254,169,193
    ,141,24,3,169,1       :REM*228
125 DATA 133,204,169,0,32,144,2
    55,76,137,150,173,188,2,162
    ,60,160,3,32,189      :REM*31
130 DATA 255,169,1,174,180,2,16
    0,5,32,186,255,32,192,255,9
    6,32,231,255,32       :REM*190
135 DATA 12,147,32,110,145,32,1
    20,145,144,3,76,199,137,173
    ,201,2,240,35,173     :REM*159
140 DATA 180,2,205,200,2,240,15
    ,173,201,2,141,233,2,173,20
    0,2,141,234,2         :REM*206
145 DATA 76,135,135,141,233,2,1
    73,201,2,141,234,2,76,135,1
    35,173,180,2,141      :REM*1
150 DATA 233,2,141,234,2,32,244
    ,146,169,58,32,210,148,174,
    221,2,189,28,155      :REM*28
155 DATA 32,210,255,169,62,32,2
    10,148,32,231,146,32,244,14
    6,32,2,139,32,94      :REM*55
160 DATA 152,32,176,144,32,204,
    255,32,25,139,173,53,3,240,
    3,76,199,137,32       :REM*112
165 DATA 98,150,32,106,150,32,1
    10,145,173,207,2,141,219,2,
    162,0,142,220,2       :REM*21
170 DATA 232,142,218,2,32,202,1
    53,169,0,141,218,2,32,244,1
    46,169,66,32,210      :REM*78
175 DATA 148,169,70,32,210,148,
    238,230,2,32,67,141,169,0,1
    41,230,2,173,186      :REM*239
180 DATA 2,201,1,208,3,76,199,1
    37,173,233,2,141,180,2,173,
    201,2,240,8           :REM*160
185 DATA 205,200,2,240,3,76,202
    ,137,32,164,137,174,241,2,3
    2,15,145,144,8        :REM*171
190 DATA 173,242,2,208,50,76,19
    9,137,142,241,2,32,59,137,1
    73,239,2,201,116      :REM*84
195 DATA 144,11,174,241,2,169,0
    ,157,0,160,76,18,136,24,173
    ,246,2,109,239        :REM*89
200 DATA 2,201,116,176,12,141,2
    46,2,238,241,2,238,242,2,76
    ,18,136,174,245       :REM*32
205 DATA 2,165,158,157,0,166,16
    5,159,157,0,167,174,243,2,3
    2,15,145,142,243      :REM*33
210 DATA 2,32,59,137,32,114,137
    ,162,1,32,198,255,160,0,32,
    207,255,145,158       :REM*138
215 DATA 32,183,255,208,6,32,14
    3,137,76,114,136,32,204,255
    ,32,123,137,32,2      :REM*5
220 DATA 145,174,245,2,165,158,
    157,0,168,165,159,157,0,169
    ,32,143,137,238,243   :REM*28
225 DATA 2,238,245,2,173,245,2,
    205,242,2,240,3,76,81,136,3
    2,244,146,169         :REM*221
230 DATA 150,32,210,148,32,231,
    146,32,244,146,32,32,137,32
    ,13,145,169,0,157     :REM*42
235 DATA 0,160,32,59,137,32,151
    ,137,32,114,137,174,244,2,1
    89,0,166,133,158      :REM*205
240 DATA 189,0,167,133,159,162,
    1,32,201,255,160,0,177,158,
    32,210,255,174,244    :REM*10
245 DATA 2,189,0,168,197,158,20
    8,7,189,0,169,197,159,240,6
    ,32,143,137,76        :REM*1
250 DATA 228,136,32,204,255,32,
    123,137,32,2,145,238,244,2,
    173,244,2,205,245     :REM*4
255 DATA 2,240,3,76,191,136,32,
    47,137,32,164,137,76,18,136
    ,169,74,32,210        :REM*93
260 DATA 148,174,221,2,189,28,1
    55,32,210,255,96,32,244,146
```

Continued on p. 108.

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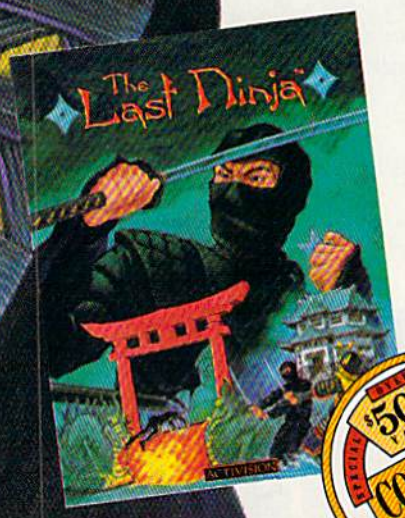
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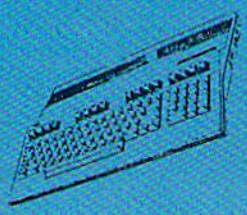
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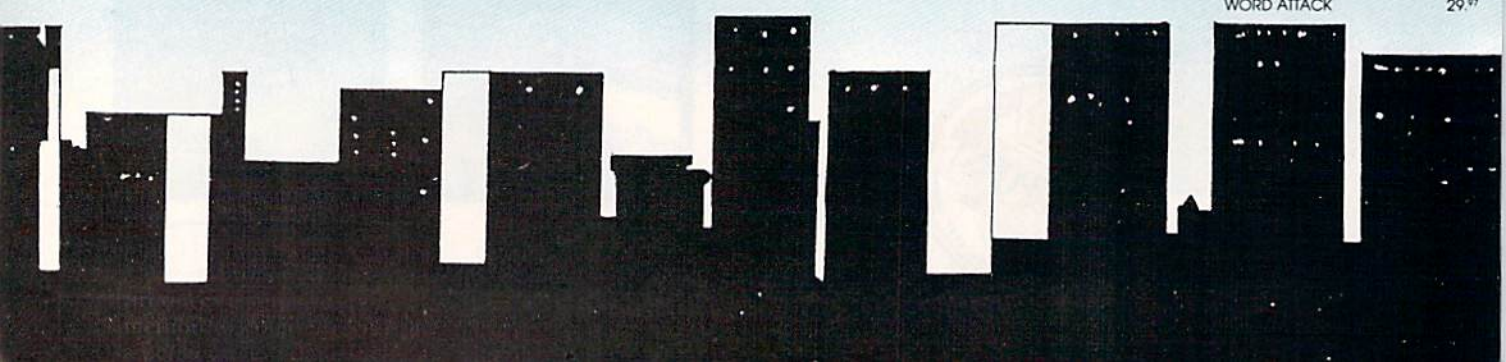
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Wordman

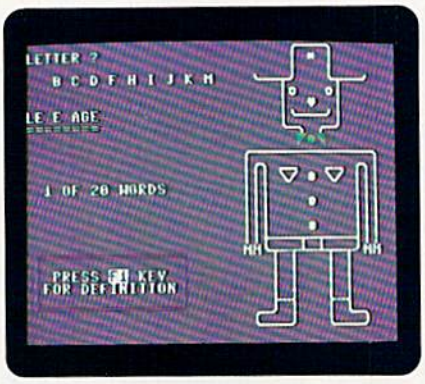
The word is out: This vocabulary and spelling game is fun and educational for all.

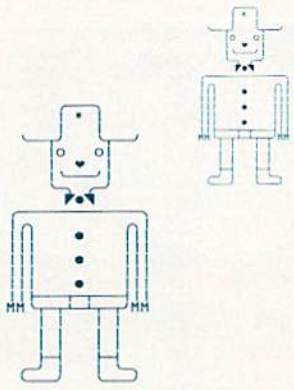
By WILLIAM TUMBLESON

Wordman, a computer game that teaches vocabulary and spelling skills, will make learning fun. While it's based on the traditional Hangman game, mistakes produce a picture of a character called "the wordman" rather than a gallows scene. Word skills are developed not only by playing the game, but by creating the word lists that the game employs.

Extensive error-trapping and on-screen directions make Wordman easy to use, yet it's flexible enough to meet a variety of instructional needs. The program uses the Kernal Plot routine extensively to move around the screen, particularly in drawing the wordman character. The disk directory is displayed by a machine language routine.

The Wordman menu screen offers six options: 1) choose a word, 2) end session/game, 3) create/edit word file, 4) load word file, 5) delete word file and 6) print word file. The options are accessed by typing their numbers and pressing the return key.





Can you guess the word in this picture?

Creating a Word File

Before play can begin, at least one word file must be created and saved to disk, using option 3. Press 3 and the return key at the menu, then indicate you want to create a new word file by pressing C. Next, type the number of words you intend to put into the file, press return and state whether definitions will be included.

A screen for typing in your words will follow. Type each one, and press return. Do not use hyphenated words. After you have entered all your words, the program will ask if they are okay. If not, they will be redisplayed for acceptance or correction.

When you finish with your list, and if you chose to include definitions, the program displays the first word in your list and asks you to enter a definition up to 36 characters long. The definition appears at the bottom of the screen as you type; then, after you press return, it moves into the box just below the word. If you're satisfied with the definition, press return again; if not, press shift/return for a chance to change it.

You can bypass entering a definition for a particular word by pressing the return key twice. Then a period, instead of a definition, will appear in the area below the word.

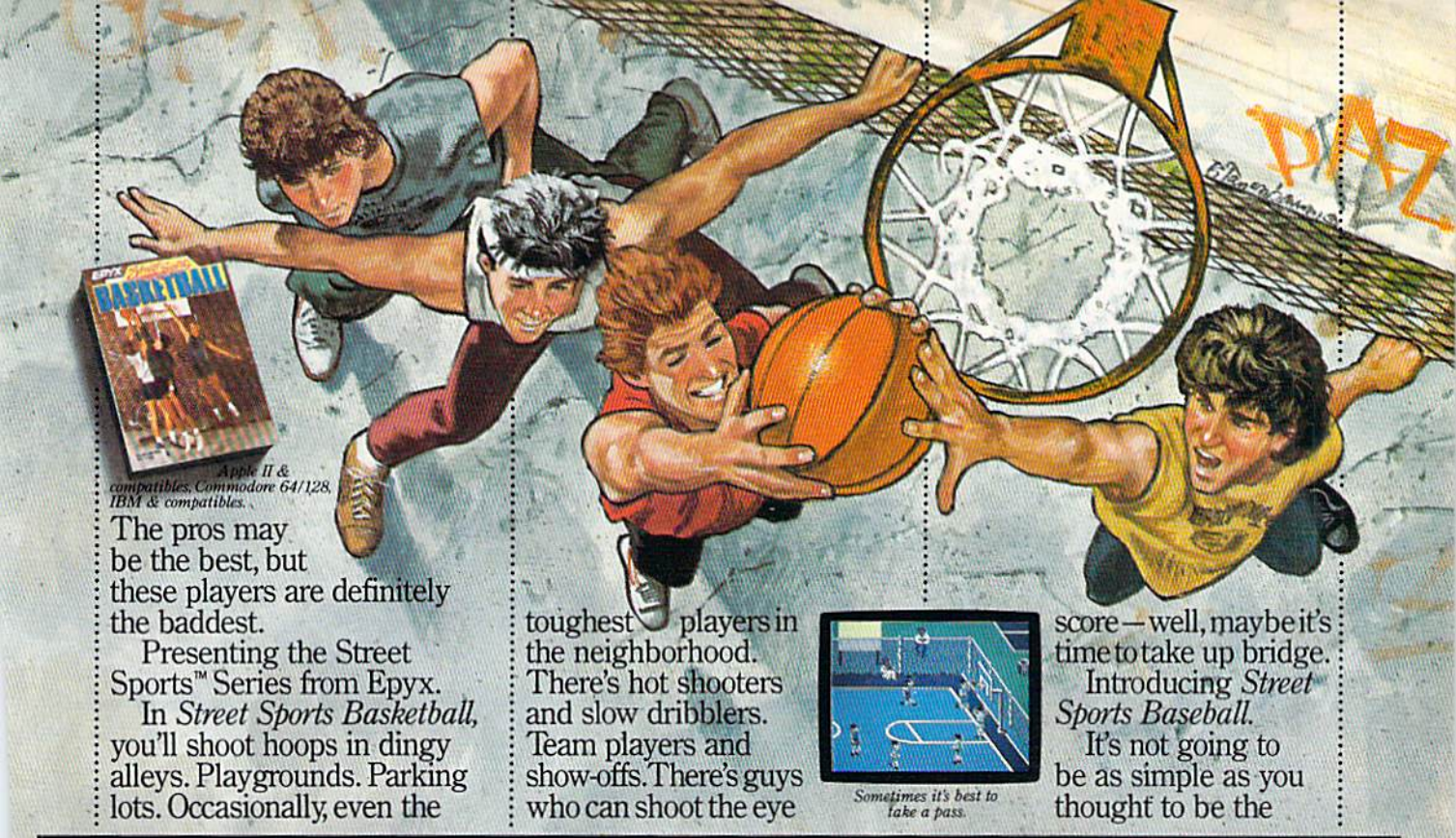
After you've finished entering all your words and definitions, you must enter a filename for saving the list, then press return. The filename can be no more than 13 characters long, because Wordman will automatically add the prefix WM, followed by a space, to it. When the file is safely on disk, the menu reappears.

Other File Operations

When you want to edit an existing word list, choose option 3 at the menu, then press E, for edit, type the name of the file you want to work on and press return. The file will load, and the program will take you through the list, one word at a time. At each word, make any changes you wish and press return. When you're done with the words, you'll have a chance to change the definitions or add definitions if there were none before. Then save the file under its previous name or a new one. If the latter, limit the filename to 13 characters to avoid an error.

Option 4 is used to load a word file. All you have to do is type the name of the file you want and press return. If you don't know which file you want, or you're unsure of the spelling, you can type $ and press return to view the disk directory. The filenames in the directory include the WM-space prefix, but you don't need to type that when entering the name of the file to load. Press return to leave the directory. After the file has loaded, the program goes back to the menu.

Option 5 is for deleting a word file. This time you do have to include the prefix when entering the filename. You can use wild cards in the filenames, but be careful you don't accidentally delete any files you wanted to keep. After typing the filename and pressing return, you must verify that the program should go ahead and delete the file you've named. If not, you can reenter the filename. Should you want to abort the deletion process altogether and go back to the menu, press return without entering a filename. ►



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ANOTHER HIT.

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

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

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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.

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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.



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Option 6 prints a copy of the word file currently in memory. After you select this option, the program will ask you to confirm that the file in memory is indeed the one you want printed. You can exclude definitions from the printout if you like.

Playing Wordman

To play Wordman, choose option 1 after loading a word file from disk. The program will randomly select a word from the file and display a line of as many equals signs as there are letters in the word. The display will also indicate how many words you've already used out of the file and whether there's a definition available for the current word. If there is a definition, you can view it by pressing F1.

Type your first guess for a letter in the word. If you're right, the program will place the letter in its respective position or positions in the line of equals signs. If you're wrong, the letter will be displayed near the top of the screen, as a reminder not to try it again.

Each time you make an incorrect guess, part of the Wordman picture is drawn. After seven incorrect guesses, a tone also sounds, and after ten, the word is shown along with the completed picture of the wordman.

Every time you finish with a word, the program goes back to the menu, and you must choose option 1 again to guess another word. Once you've used all the words in the file, totals for the file are displayed, and the program asks if you want to play again. If so, it takes you back to the menu; if not, it exits to Basic.

You can also exit Wordman by selecting option 2 in the menu. Your score will be displayed, and you'll be asked to verify that you want to leave the program. If you change your mind and say no, you'll return to the menu for another round of . . . Wordman. R

William Tumbleson developed this program to increase his daughter's vocabulary and computing skills. He is a computer technician for Wang Laboratories.

Listing 1. Wordman program.

```
Ø REM WORDMAN BY W. TUMBLESON
                              :REM*126
5 POKE788,52:POKE82Ø,6:POKE5328
  Ø,3:POKE53281,Ø:PRINT"{CTRL 4
  }{SHFT CLR}{CRSR DN}{CRSR RT}
  ";                          :REM*1Ø9
1Ø DEFFNA(X)=INT(RND(Ø)*(25)+65
   ):DEFFNB(Y)=INT(RND(Ø)*(9)+2
   )                          :REM*114
15 FORJ=19TO1STEP-1:PRINTTAB(J)
   :GOSUB4Ø:PRINTTAB(39-J):GOSU
   B4Ø:PRINT"{CRSR UP}":NEXT
                              :REM*63
2Ø FORI=1TO23:POKE646,FNB(Y):PR
   INT" "CHR$(FNA(X))TAB(38);:G
   OSUB4Ø                     :REM*114
25 PRINT:NEXT:PRINT"{CRSR RT}{C
   RSR UP}";                  :REM*221
3Ø FORJ=1TO19STEP1:PRINTTAB(J):
   GOSUB4Ø:PRINTTAB(39-J):GOSUB
   4Ø                         :REM*1Ø2
35 PRINT"{CRSR UP}":NEXT:GOTO45
                              :REM*145
4Ø POKE646,FNB(Y):PRINTCHR$(FNA
   (X));:RETURN               :REM*252
45 A$=" ":N$="{7 SPACEs}W O R D
    M A N{6 SPACEs}"          :REM*1Ø3
5Ø A=1:B=26:Z=32:D=1:K=Z:L=Z:M=
   Z:N=Z:P=41:R=39            :REM*58
55 IFA>BTHEN12Ø               :REM*231
6Ø G=1Ø23+E:H=1Ø64-F:I=1663+E:J
   =17Ø4-F:N1$=MID$(N$,A,D):N2$
   =MID$(N$,B,D)              :REM*174
65 IFN1$=A$THENA=A+D:E=E+D:GOTO
   55                         :REM*69
7Ø IFN2$=A$THENB=B-D:F=F+D:GOTO
   55                         :REM*146
75 POKEG,K:G=G+P:K=PEEK(G):POKE
   G,ASC(N1$)-64:POKEH,L:H=H+R:
   L=PEEK(H)                  :REM*185
8Ø POKEH,ASC(N2$)-64          :REM*34
85 POKEI,M:I=I-R:M=PEEK(I):POKE
   I,ASC(N1$)-64:POKEJ,N:J=J-P:
   N=PEEK(J)                  :REM*119
9Ø POKEJ,ASC(N2$)-64          :REM*6Ø
95 IFG>=ITHENA=A+D:B=B-D:E=E+D:
   F=F+D:K=Z:L=Z:M=Z:N=Z:GOTO55
                              :REM*93
1ØØ GOTO75                    :REM*152
1Ø5 PRINT"{SHFT CLR}":DIMW(2Ø),
   ER$(16),WD$(2Ø),DF$(2Ø),G$(
   16)                        :REM*35
11Ø SP$="{36 SPACEs}":CR$=CHR$(
   13)                        :REM*216
115 LL$="{CTRL 2}NAME TOO LONG
   (MAX OF 13 CHARACTERS){CTRL
    8}"                       :REM*117
12Ø P$="PRESS {CTRL 9}ANY{CTRL
   Ø} KEY":S=54272:S1=54296:IF
   RW=1THENRW=Ø:RETURN:REM*22Ø
125 PRINT"{HOME}{5 CRSR DNs}":G
   OSUB725:FORI=1TO3:GOSUB73Ø:
   NEXT:GOSUB725              :REM*21
13Ø FORT=1TO1ØØØ:NEXT:PRINTTAB(
   19)"{2 CRSR DNs}{COMD 6}BY{
   CRSR DN}"                  :REM*34
135 PRINTTAB(12)"WILLIAM TUMBLE
   SON":PRINTTAB(16)"{CRSR DN}
   (C) 1987":FORA=83ØTO945
                              :REM*179
14Ø READB:POKEA,B:NEXT:X=2Ø
                              :REM*2Ø2
145 Y=14:Z$="{CTRL 8}"+P$:GOSUB
   72Ø:X=21:Y=11:Z$="{COMD 5}(
   F8)=BLACK BACKGROUND":POKE1
   98,Ø                       :REM*97
15Ø GOSUB72Ø:GETA$:ON((A$="")+2
   )GOTO15Ø:IFA$=CHR$(14Ø)THEN
   POKE82Ø,Ø                  :REM*78
155 PRINT"{SHFT CLR}":POKE53281
   ,1:PRINT"{COMD 2}":POKE198,
   Ø:PRINTTAB(16)"{CRSR DN}M E
    N U"                      :REM*185
16Ø PRINTTAB(16)"{7 COMD Us}{CR
   SR DN}"                    :REM*168
165 PRINTTAB(1Ø)"({CTRL 9}1{CTR
   L Ø}) CHOOSE A WORD{CRSR DN
   }":PRINTTAB(1Ø)"({CTRL 9}2{
   CTRL Ø}) END SESSION / GAME
   {CRSR DN}"                 :REM*177
17Ø PRINTTAB(1Ø)"({CTRL 9}3{CTR
   L Ø}) CREATE / EDIT WORD FI
   LE{CRSR DN}"               :REM*4Ø
175 PRINTTAB(1Ø)"({CTRL 9}4{CTR
   L Ø}) LOAD WORD FILE{CRSR D
   N}"                        :REM*153
18Ø PRINTTAB(1Ø)"({CTRL 9}5{CTR
   L Ø}) DELETE WORD FILE{CRSR
    DN}":PRINTTAB(1Ø)"({CTRL 9
   }6{CTRL Ø}) PRINT WORD FILE
   {2 CRSR DNs}"              :REM*18Ø
185 PRINTTAB(18)"ENTER{CRSR DN}
   ":PRINTTAB(13)"# OF YOUR CH
   OICE{CRSR DN}":IFOP<>1THENO
   P$="Ø"                     :REM*79
19Ø INPUT"{19 SPACEs}";OP$:OP=V
   AL(OP$):IFOP<1OROP>6THENGOT
   O735                       :REM*6Ø
195 PRINT"{SHFT CLR}":POKE53281
   ,PEEK(82Ø):PRINT"{CTRL 8}"
                              :REM*15
2ØØ ONOPGOTO2Ø5,33Ø,375,52Ø,595
   ,99Ø                       :REM*242
2Ø5 PRINT"{SHFT CLR}":IFC=ØORWC
   =CTHEN745                  :REM*195
21Ø R=INT(RND(Ø)*(C))+1:IFW(R)=
   99THEN21Ø                  :REM*122
215 W(R)=99:WC=WC+1:RR=Ø:IFDF$(
   R)="."THENRR=1             :REM*139
22Ø L=LEN(WD$(R)):FORP=1TOL:ER$
   (P)=MID$(WD$(R),P,(1)):NEXT
   :PRINT"{HOME}{6 CRSR DNs}"
                              :REM*8Ø
225 FORG=1TOL:PRINT"=";:NEXT:IF
   RR=1THEN24Ø                :REM*21
23Ø X=18:Y=9:Z$="{CTRL 2}{2 COM
   D @s}{CTRL 8}":GOSUB72Ø:X=1
   9:Y=1:Z$="{2 SPACEs}PRESS {
   CTRL 9}{CTRL 2}F1{CTRL Ø}{C
   TRL 8} KEY ":GOSUB72Ø:X=2Ø
                              :REM*78
235 Z$=" FOR DEFINITION":GOSUB7
   2Ø:LE=1:DO=18:WI=16:DE=4:GO
   SUB91Ø                     :REM*215
24Ø CT=Ø:X=12:Y=1:Z$="{COMD 6}"
```

Continued on p. 116.

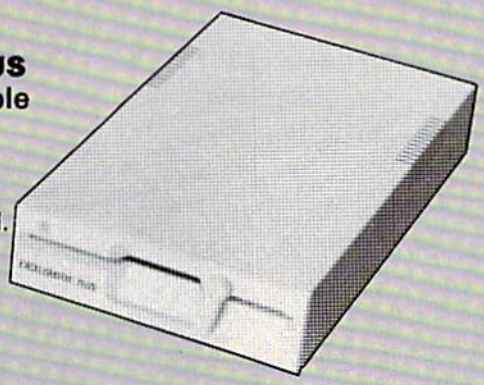
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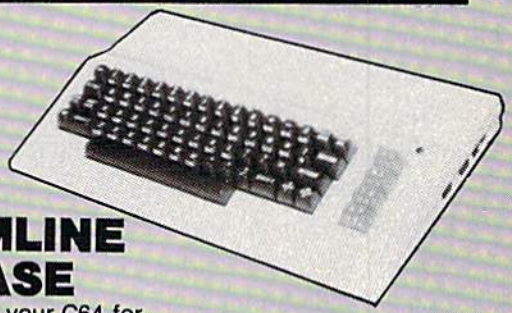
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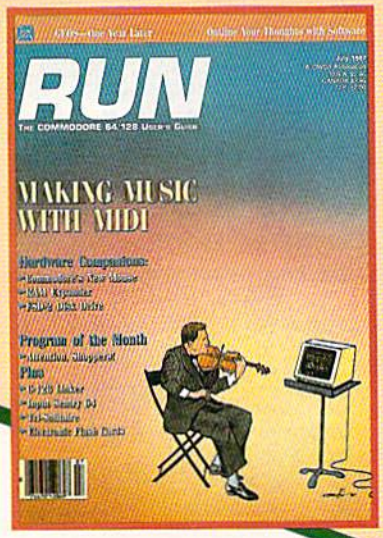
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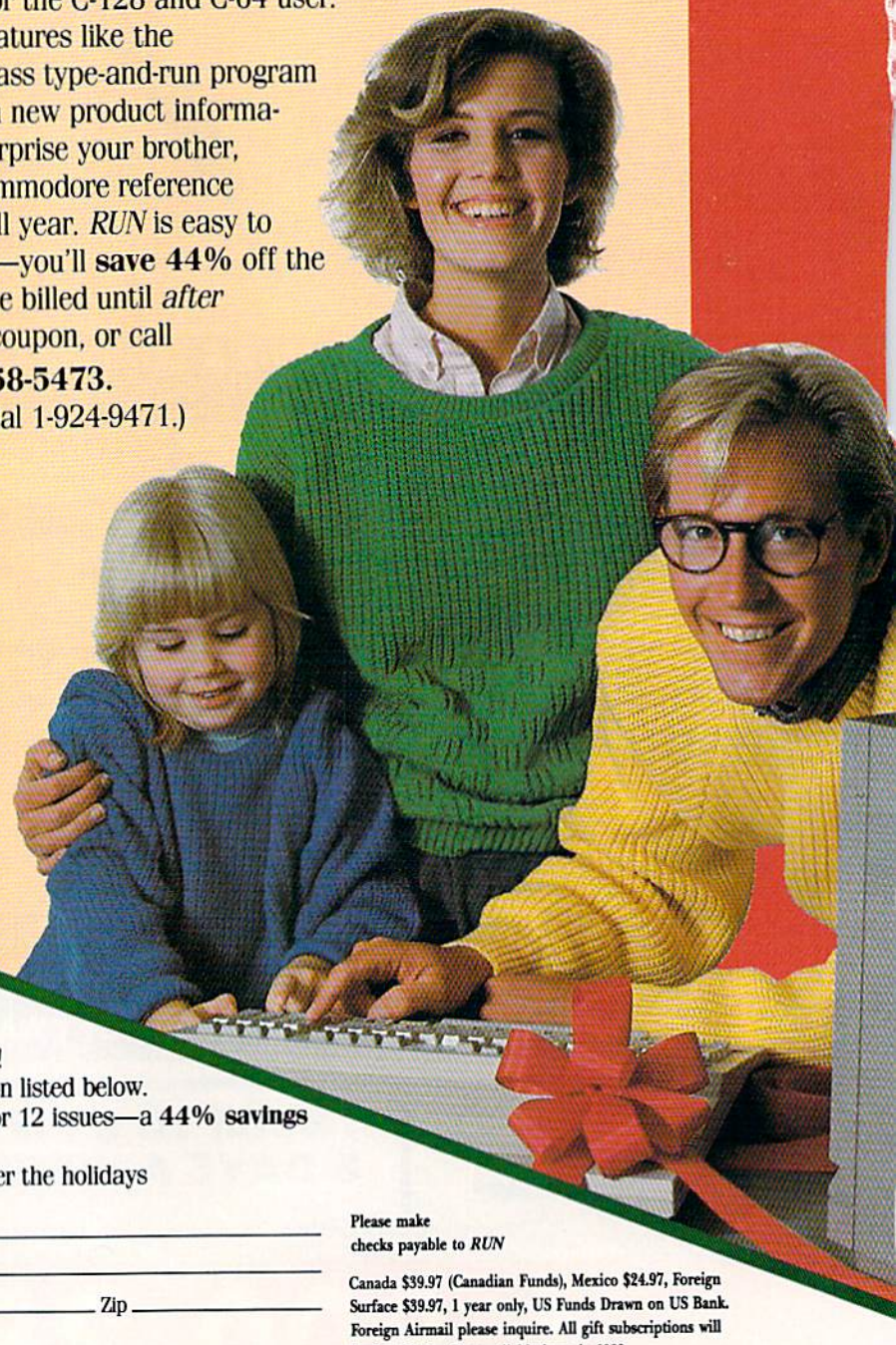
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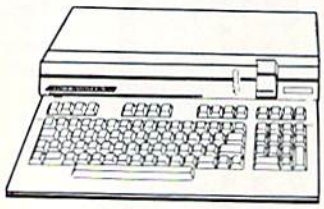
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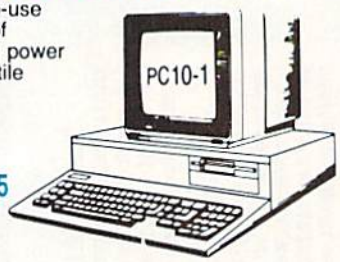


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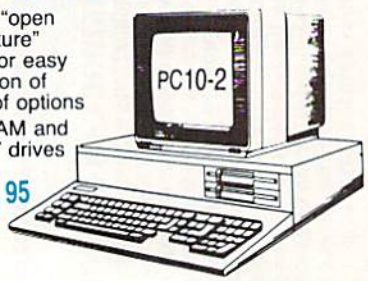
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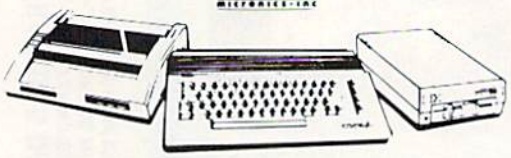
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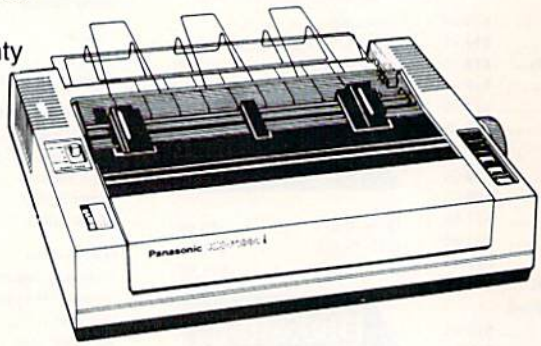
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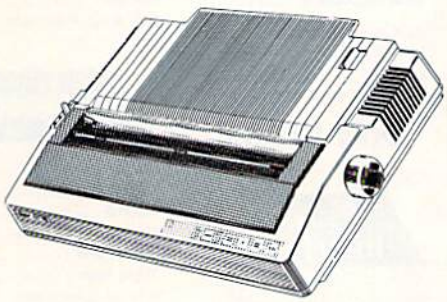
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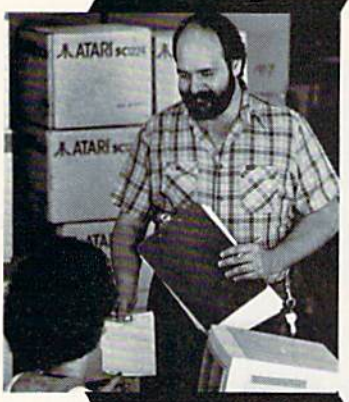
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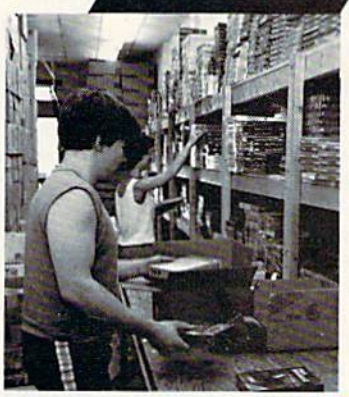
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Color Hi-Res Graphics

Draw in all 16 colors in 80-Column mode with this C-128 graphics utility.

By DANIEL MONTES

The excellent Ultra Hi-Res program by Louis Wallace and David Darus in the February and May 1986 issues of *RUN* gave the C-128 a set of commands for high-resolution (640 × 200 pixels) drawing in 80-Column mode. However, this mode won't let you use all 16 C-128 colors simultaneously. To make this possible, I've written a graphics utility called Color Hi-Res Graphics, which does what you might call pseudo-hi-res drawing in 80-Column mode.

Color Hi-Res Graphics lets you define a new character and update the corresponding attribute address for that character's position. The result: a 256 × 112-pixel frame with colorful high-resolution graphics. The program's only limitation is that it allows just one color inside each 8 × 8-pixel character.

Type in Listing 1 carefully and save it. When you run it, a machine language program called CHR.Graph is written to disk. Your own applications program can then load CHR.Graph with the BLoad command. Listing 2, a demonstration program, presents some ideas for applications programs.

If you use other machine language utilities with Color Hi-Res Graphics, make sure each Color Hi-Res command is used in bank-15 configuration. Also, the pi symbol (π) and all control characters with a screen code higher than 63 won't appear in your listings until the original shapes and characters are restored.

New Commands

Color Hi-Res Graphics provides seven new drawing commands. They're activated with a SYS command, followed by an address and any necessary parameters. The address of each command can be given in either numeric or variable form. See line 20 of the demonstration program for an example of the latter.

In this pseudo-hi-res mode, the text screen is displayed. You can use the Print command if printing occurs outside the borders of the window, so a "black hole" won't appear in your hard copy. After each command is issued, the cursor position for printing text or numbers is preserved.



Various graphics created with the Color Hi-Res program.

All commands requiring parameters check the range of the parameters and produce an Illegal Quantity error if your input is out of range.

A list of the new commands follows:

1. SET UP HI-RES AREA: SYS HR,XS,YS. HR equals 4864; XS is the column number of the upper-left border of the hi-res window (0–48); and YS is the row number of the upper-left border of the hi-res window (0–11).

This hi-res window can be placed anywhere on the screen, as reflected in the ranges allowed for the coordinates. You can't see the window, since it's the same color as the background. After this routine is called, all the standard character shapes are cleared from the window.

2. PLOT A POINT: SYS PL,XP,YP,CP. PL equals 4867; XP is the X-coordinate of the point (0–255); YP is the Y-coordinate of the point (0–111); and CP is the color of the point (0–15).

A point is plotted at the given coordinate. If another point is located nearby, and if both points are involved in the same character, they share the last color defined.

3. UNPLOT (ERASE) A POINT: SYS UP, XP,YP. UP equals 4870; XP is the X-coordinate of the point (0–255); and YP is the Y-coordinate of the point (0–111).

This command erases a point at the given coordinate, giving it the same color as the background.

4. DRAW A LINE: SYS DR,XD,YD,CD. DR equals 4873; XD is the destination X-coordinate of the line (0–255); YD is the destination Y-coordinate of the line (0–111); and CD is the line color (0–15).

Every line is drawn using this method. First, the origin coordinates must be set, usually by plotting a point at that location. Then you must issue a Draw command. The same rules for color zones that apply to the Plot command are applicable here. If this command is the first encountered after the hi-res area has been defined, a default origin of 0,0 is used.

5. UNDRAW (ERASE) A LINE: SYS UD, XD,YD. UD equals 4876; XD is the destination X-coordinate of the line (0–255); and YD is the destination Y-coordinate of the line (0–111).

The line between the last coordinates and the ones specified is erased.

6. CLEAR HI-RES AREA: BSYS CS. CS equals 4879.

All the shapes and characters are cleared, but the hi-res area is still intact.

7. RESTORE CHARACTER SHAPES: SYS RS. RS equals 4882.

The character shapes are restored, and the entire screen is cleared.

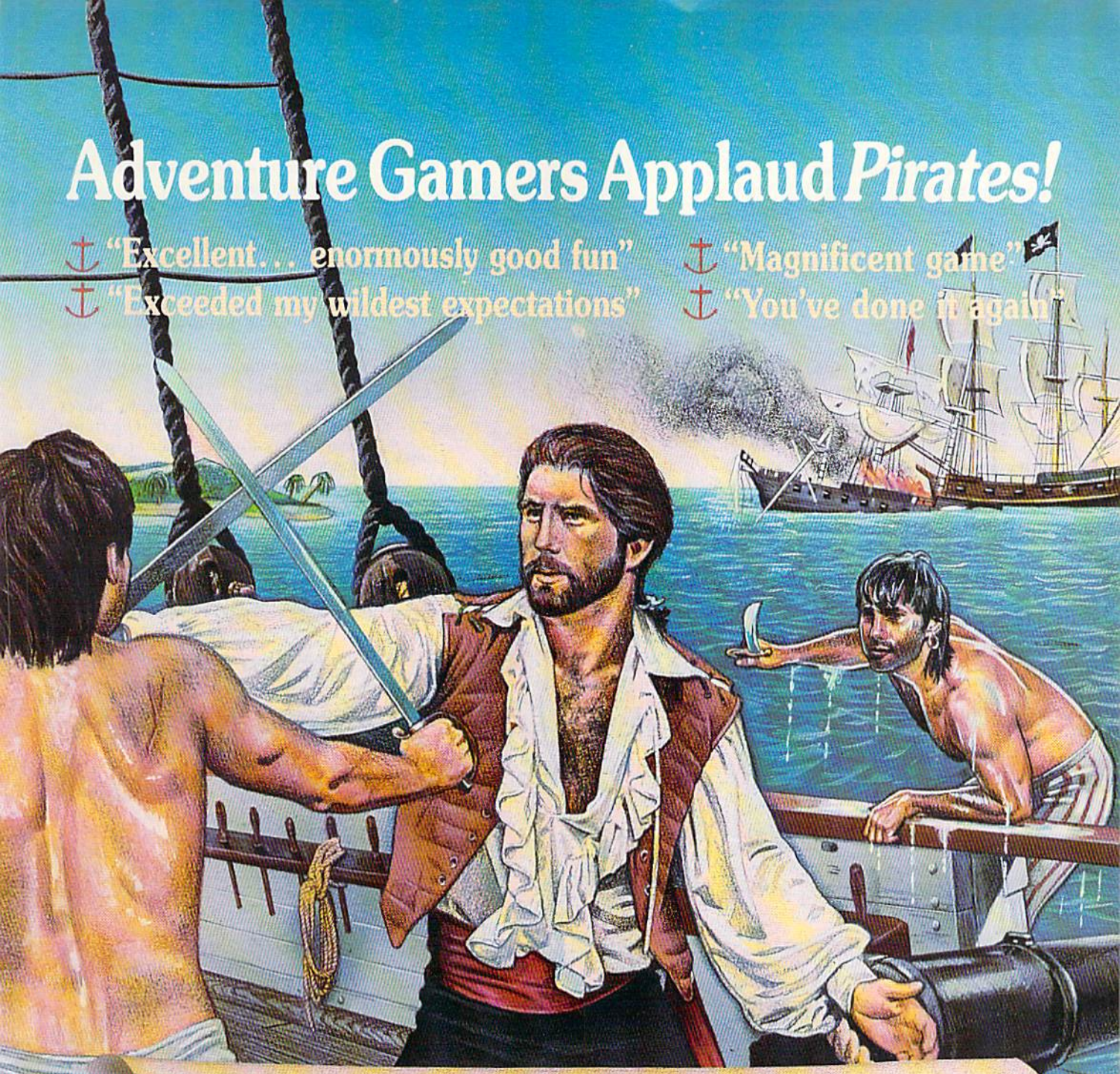
80-Column Memory Configuration

Color Hi-Res Graphics creates designs by redefining the shapes of characters instead of using Hi-Res mode (setting bit 7 of register 25). I wrote it ►

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this way because the shapes are stored in the 80-column chip's 16K RAM. Here's a brief outline of the memory configuration of this chip:

1. $0000–$07CF. Video RAM—2000 bytes used to display screen characters.
2. $07D0–$07FF. 48 unused bytes.
3. $0800–$0FCF. Attribute RAM—a 2000-byte area that holds the attributes of the corresponding video RAM, including character color, underlining and flashing.
4. $0FD0–$1FFF. 48 unused bytes.
5. $2000–$3FFF. CHARRAM (character generator RAM)—an 8K area where character shapes are defined.



In 80-Column mode, you can define characters and display them anywhere on the screen by just poking them into video RAM. However, not all the shapes and characters can be modified. I preserved the first 64 definitions, including all the letters in uppercase, numbers 0–9, all the punctuation marks and some others, so you can include text with your graphics.

Here's how I calculated the number of characters available for redefinition. There is a total of 512 characters (256 each for upper- and lowercase). I subtracted 64 (the number of characters not modified), leaving 448. This allows for a 32 × 14-character window anywhere on the screen, where you can put the available shapes and characters, one after the other.

The net result is a "pseudo" hi-res frame of 256 × 112 pixels. The frame occupies about one quarter of the screen, which is adequate for many applications. R

Daniel Montes is an aeronautical engineer at a research institute in Argentina. He is also president of his local Commodore user's group.

Listing 1. Color Hi-Res Graphics program.

```
10 REM COLOR HIRES GRAPHICS LOA
   DER                    :REM*234
20 REM BY DANIEL MONTES :REM*52
30 CK=0:SCNCLR:PRINT"READING DA
   TA..."                 :REM*10
40 FOR I=4864 TO 5526:READ A:PO
   KE I,A:CK=CK+A:NEXT :REM*192
50 IF CK<>8232Ø THEN PRINT"ERRO
   R IN DATA STATEMENTS":STOP
                          :REM*174
60 PRINT"PUT THE DISK IN THE DR
   IVE AND PRESS ANY KEY TO CRE
   ATE CHR.GRAPH"         :REM*72
70 GETKEY A$:BSAVE "CHR.GRAPH",
   B0,P4864 TO P5527      :REM*86
80 IF DS<>0 THEN PRINT"DISK ERR
   OR:";DS$:STOP          :REM*206
90 PRINT"CHR.GRAPH CREATED":END
                          :REM*76
100 DATA 76,25,19,76,81,19,76,1
    02,19,76,3,20,76,24,20,76,1
    1,21,76,135,21,0      :REM*58
110 DATA 0,0,0,32,109,21,201,49
    ,176,87,224,12,176,83,141,2
    3,19,142,24,19        :REM*20
120 DATA 165,215,48,3,32,95,255
    ,32,222,106,32,11,21,32,159
    ,200,169,64,32        :REM*178
130 DATA 56,21,32,139,200,169,0
    ,32,56,21,32,143,21,169,0,1
    33,251,133,252        :REM*86
140 DATA 96,32,109,21,224,112,1
    76,31,192,16,176,27,169,1,1
    33,119,32,122,19      :REM*26
150 DATA 76,143,21,32,109,21,22
    4,112,176,10,169,0,133,119,
    32,122,19,76,143      :REM*20
160 DATA 21,76,40,125,169,0,133
    ,202,169,36,133,203,165,251
    ,160,3,32,223,20      :REM*74
170 DATA 165,252,160,8,32,223,2
    0,165,252,41,7,133,9,169,0,
    133,10,32,240,20      :REM*156
180 DATA 165,251,41,7,168,185,1
    08,206,133,114,73,255,133,1
    15,32,254,20,32       :REM*128
190 DATA 216,205,166,119,240,4,
    5,114,208,2,37,115,72,32,25
    4,20,104,32,202       :REM*124
200 DATA 205,165,119,240,56,165
    ,251,74,74,74,24,109,23,19,
    168,132,6,165         :REM*206
210 DATA 252,74,74,74,24,109,24
    ,19,170,32,240,255,164,6,32
    ,249,205,164,113      :REM*4
220 DATA 185,92,206,133,17,32,2
    16,205,41,224,5,17,133,17,1
    64,6,32,249,205       :REM*134
230 DATA 165,17,32,202,205,96,7
    6,40,125,224,112,176,249,19
    2,16,176,245,32       :REM*60
240 DATA 118,21,169,1,133,119,3
    2,41,20,76,143,21,224,112,1
    76,228,32,118,21      :REM*210
250 DATA 169,0,133,119,32,41,20
    ,76,143,21,165,253,141,21,1
    9,165,254,141,22      :REM*22
260 DATA 19,160,0,132,250,132,2
    00,132,201,165,253,197,251,
    176,16,166,251        :REM*143
270 DATA 164,252,165,253,133,25
    1,165,254,133,252,134,253,1
    32,254,56,165         :REM*149
280 DATA 253,229,251,133,7,56,1
    65,254,229,252,133,8,16,11,
    56,165,252,229        :REM*167
290 DATA 254,133,8,169,1,133,25
    0,32,122,19,165,7,197,8,144
    ,58,165,251,197       :REM*129
300 DATA 253,240,89,24,165,200,
    101,8,133,200,165,201,105,0
    ,133,201,165,201      :REM*13
310 DATA 208,6,165,200,197,7,14
    4,24,56,165,200,229,7,133,2
    00,165,201,233,0      :REM*3
320 DATA 133,201,165,250,240,5,
    198,252,76,170,20,230,252,2
    30,251,76,108,20      :REM*139
330 DATA 165,252,197,254,240,31
    ,24,165,200,101,7,133,200,1
    97,8,144,6,229,8      :REM*125
340 DATA 133,200,230,251,165,25
    0,240,5,198,252,76,108,20,2
    30,252,76,108,20      :REM*191
350 DATA 172,21,19,132,251,172,
    22,19,132,252,96,74,74,74,1
    33,9,169,0,133        :REM*91
360 DATA 10,24,6,9,38,10,136,16
    ,248,24,165,9,101,202,133,2
    02,165,10,101         :REM*197
370 DATA 203,133,203,96,162,18,
    165,203,32,204,205,232,165,
    202,76,204,205        :REM*177
380 DATA 162,18,169,36,133,219,
    32,204,205,232,169,0,133,21
    8,32,204,205,169      :REM*63
390 DATA 0,160,15,32,202,205,13
    6,16,250,24,165,218,105,16,
    133,218,144,237       :REM*233
400 DATA 230,219,165,219,201,64
    ,144,229,96,133,112,166,252
    ,164,251,24,32        :REM*93
410 DATA 240,255,32,93,21,164,2
    51,32,230,205,160,31,165,11
    2,32,202,205,230      :REM*29
420 DATA 112,136,16,246,230,252
    ,165,112,208,222,96,164,251
    ,32,249,205,165       :REM*207
430 DATA 241,160,31,32,202,205,
    136,16,250,96,133,251,134,2
    52,132,113,76         :REM*225
440 DATA 124,21,133,253,134,254
    ,132,113,72,165,236,133,142
    ,165,235,133,143      :REM*237
450 DATA 104,96,169,147,32,210,
    255,76,98,255,166,143,164,1
    42,24,76,240,255      :REM*87
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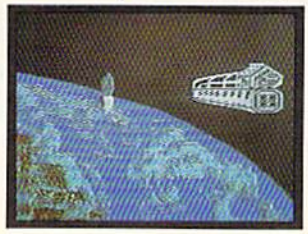


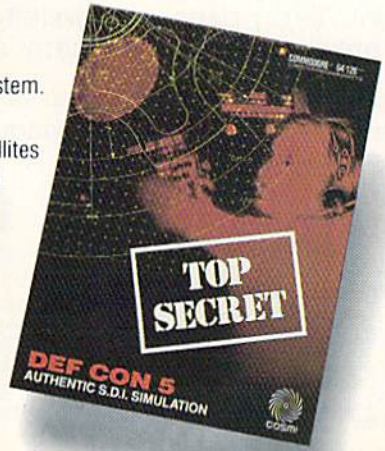
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Listing 2. Demonstration program.

```
10 REM 80-COLUMN HIRES COLOR DE
   MO                          :REM*6
20 REM BY DANIEL MONTES :REM*52
40 BLOAD"CHR.GRAPH",B0:BANK 15:
   FAST                        :REM*172
50 HR=4864:PL=HR+3:UP=PL+3:DR=U
   P+3:UD=DR+3:CS=UD+3:RS=CS+3
                               :REM*164
60 SYS HR,22,10                :REM*152
70 PRINTCHR$(19)CHR$(142)CHR$(1
   49)TAB(25)"COLOR HIRES IN 80
    COLUMNS"                   :REM*180
80 CHAR1,2,2,"YOU NOW HAVE AN 8
   0-COL. HIRES SCREEN IN WHICH
    YOU CAN DRAW IN ALL 16 COLO
   RS."                        :REM*150
90 RN=RND(-TI)                 :REM*36
100 :                          :REM*76
110 CHAR1,30,9,"RANDOM PATTERNS
   "                           :REM*172
120 FOR I=1 TO 350             :REM*116
130 SYS PL,256*RND(1),112*RND(1
   ),1+15*RND(1)               :REM*190
140 NEXT                       :REM*150
150 SLEEP 3:SYS CS             :REM*4
160 :                          :REM*136
170 CHAR1,30,9,"BUSINESS GRAPHS
   "                           :REM*80
180 SYS PL,7,7,10              :REM*180
190 SYS DR,7,104,10:SYS DR,248,
   104,10                      :REM*150
200 FOR X=12 TO 236 STEP 32
                               :REM*248
210 CL=1+15*RND(1):HI=20+70*RND
   (1)                         :REM*136
220 FOR XX=X TO X+12 STEP 3
                               :REM*236
230 SYS PL,XX,103,CL           :REM*148
240 SYS DR,XX,103-HI,CL:REM*106
250 NEXT:NEXT                  :REM*254
260 SLEEP 3:SYS CS             :REM*115
270 :                          :REM*247
280 CHAR1,29,9,"DESIGNING FOR F
   UN"                         :REM*53
290 FOR R=40 TO 0 STEP -10:SYS
   PL,41+R,40,1+R/10           :REM*157
300 FOR A=0 TO 2*{PI} STEP {PI}
   /16                         :REM*147
310 SYS DR,41+R*COS(A),40+R*SIN
   (A),1+R/10                  :REM*61
320 NEXT:NEXT                  :REM*69
330 FOR X=5 TO 255 STEP 10
                               :REM*253
340 SYS PL,X,111,10            :REM*155
350 SYS DR,255,0,10            :REM*151
360 NEXT                       :REM*115
370 FOR I=1 TO 200             :REM*233
380 SYS PL,100+60*RND(1),38*RND
   (1),14                      :REM*199
390 NEXT                       :REM*145
400 CHAR1,32,4,"{CTRL O}ENJOY!"
   :SLEEP 4                    :REM*163
410 SYS RS                     :REM*221
```

■

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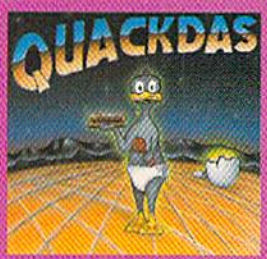
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? ? ? ? ? ? ? (The Hitchhiker's Guide to Galaxian Software)

" . . . an interesting implementation of an adventure game. It's hard to believe that so many abstract perversions can be contained in one place. ENTROPY is destined to become another milestone in the realm of interactive fiction. "



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Circle 59 on Reader Service card.



Snowflake

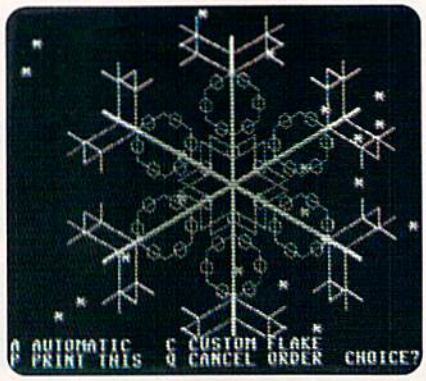
Get those snowshovels out—it's a winter wonderland in your C-128.

Program by IAN ADAM; Article by TIM WALSH

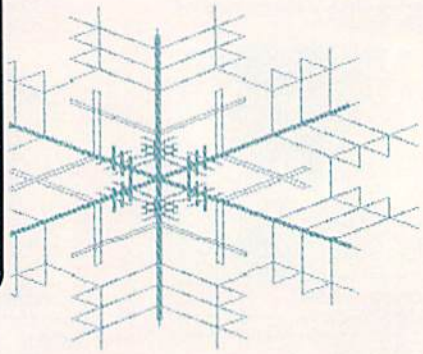
Ian Adam wrote the article that originally accompanied the Snowflake 128 program (Listing 1). Unfortunately, the original manuscript and disk vanished, and we can't contact Mr. Adam, who, according to his office colleagues, is vacationing in "the islands." Rather than postpone publication of the program until Ian Adam can be reached, your technical editor has undertaken to write this documentation.

A program without equal, Snowflake 128 lets you design snowflakes in 40-Column mode on the C-128. Type it in, using 128 Perfect Typist, and save it to disk before running it. Next, run it and, after the introductory snowflake appears, try your hand at custom designing snowflakes on the screen. A menu at the bottom of the screen lets you print them out on any Star Micronics or Epson-compatible printer.

Snowflake 128 also has the advantage of letting you enjoy the beauty of snowflakes any time of the year, regardless of where you live. If you live in a snowbelt region, you can hold contests to see who can design the most elegant snowflake. The prize could be a day off from shoveling.



Sample screen from Snowflake 128.



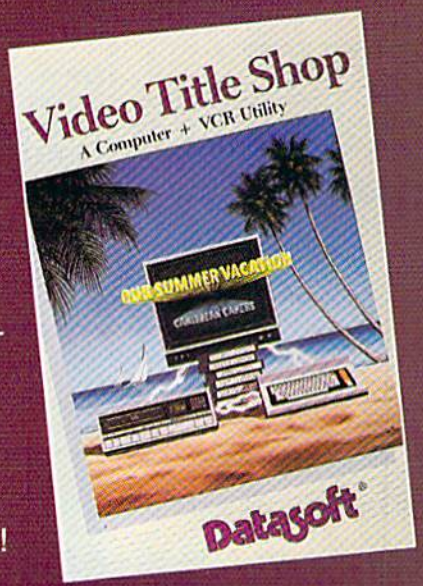
Of course, if you live in Hawaii or Bermuda, such contests aren't very practical. In that case, on a warm January afternoon, when the tropical breezes are gently swaying the palm trees, go inside and boot up Snowflake 128. And, as you're creating those lovely snowflakes, picture the *RUN* staff up in New Hampshire, buried under tons of white stuff, and try not to laugh. Ⓡ

Ian Adam has authored several programs for RUN*; Technical Editor Tim Walsh spends days and evenings with computers.*

Listing 1. Snowflake 128 program.

```
Ø REM SNOWFLAKE 128 BY IAN ADAM
                          :REM*7Ø
1Ø PRINT"{SHFT CLR}"      :REM*Ø
2Ø GOSUB 111Ø,SETUP:GOSUB 7ØØ,D
   EMO                    :REM*14Ø
3Ø DO                     :REM*2Ø6
4Ø TRAP 7Ø:GOSUB 8Ø       :REM*62
5Ø ON INSTR("ACPQ",M$) GOSUB 12
   Ø,26Ø,65Ø,67Ø          :REM*246
6Ø LOOP                   :REM*24Ø
7Ø CLR:GOSUB 122Ø:GOTO 3Ø
                          :REM*15Ø
8Ø GRAPHIC 2,,23          :REM*2Ø4
9Ø PRINT"A AUTOMATIC{3 SPACEs}C
    CUSTOM FLAKE"         :REM*2Ø8
1ØØ PRINT"P PRINT THIS{2 SPACEs
    }Q CANCEL ORDER{2 SPACEs}CH
    OICE";                :REM*19Ø
11Ø INPUT M$:RETURN       :REM*28
12Ø NS=4:BG=RND(Ø)>.5     :REM*112
13Ø FOR I=1 TO 4          :REM*1Ø4
14Ø SD(I)=INT(1+RND(Ø)*4)
                          :REM*134
15Ø SP(I)=5Ø*(RND(Ø)+I):REM*13Ø
16Ø SC(I)=C(RND(Ø)*5)     :REM*54
17Ø B=28Ø-SP(I):IF B>14Ø THEN B
    =28Ø-B                :REM*9Ø
18Ø SZ(I)=6Ø+RND(Ø)*B     :REM*172
19Ø SV(I)=RND(Ø)*4        :REM*116
2ØØ IF SD(I)=1 THEN SV(I)=SV(I)
    *9                    :REM*212
21Ø IF SD(I)=2 THEN BEGIN
                          :REM*248
22Ø SV(I)=SZ(I)/(1-(SV(I)>2))
                          :REM*25Ø
23Ø SZ(I)=SZ(I)*3         :REM*6Ø
24Ø IF SP(I)+SZ(I)>LA THEN SP(I
    )=Ø                   :REM*212
25Ø BEND                  :REM*19Ø
255 NEXT:GOTO 76Ø         :REM*255
26Ø GRAPHIC 2,1,13:SCALE 1,999,
    8ØØ                   :REM*43
27Ø PRINT"CUSTOM SNOWFLAKE DESI
    GN"                   :REM*255
28Ø PRINT"{CRSR DN}DESCRIBE THE
     SHAPES THAT"         :REM*135
29Ø PRINT"YOU WANT ON EACH ARM:
    "                     :REM*193
3ØØ COLOR 1,4:NS=Ø        :REM*2Ø7
31Ø FOR I=-3 TO 3:LOCATE X+I,Y:
    DRAW TO LA;Ø:NEXT     :REM*251
32Ø FOR I=1 TO 9          :REM*169
33Ø TRAP 33Ø:PRINT"{CRSR DN}SHA
    PE #"I                :REM*187 ►
```

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Circle 107 on Reader Service card.

SNOWFLAKE

```
34Ø PRINT"1{2 SPACEs}CHEVRON":P
    RINT"2{2 SPACEs}HEXAGON":PR
    INT"3{2 SPACEs}BRANCHES":PR
    INT"4{2 SPACEs}STAR"
                        :REM*177
35Ø PRINT"Ø{2 SPACEs}FINISHED":
    INPUT"ENTER Ø TO 4";D
                         :REM*97
36Ø SD(I)=D:IF D<1 THEN I=9:GOT
    O 49Ø                :REM*241
37Ø INPUT"{CRSR DN}DISTANCE FRO
    M MIDDLE Ø-28Ø";A    :REM*79
38Ø SP(I)=ABS(A):IF A>28Ø THEN
    37Ø                  :REM*247
39Ø PRINT"{CRSR DN}COLOR OF THI
    S SHAPE, 1 TO 16:" :REM*163
4ØØ INPUT"(2 4 7 14 15 ARE BEST
    )";A                 :REM*225
41Ø SC(I)=((A-1)AND 15)+1
                        :REM*169
42Ø B=LA-SP(I):IF B>2ØØ THEN B=
    4ØØ-B                :REM*21
43Ø PRINT"{CRSR DN}SIZE, RANGE"
    2Ø"TO"B              :REM*87
44Ø INPUTL:SZ(I)=L:IF L<2Ø OR L
    >B THEN 43Ø          :REM*1Ø3
45Ø ON D GOSUB 54Ø,57Ø,61Ø,61Ø
                        :REM*141
46Ø LL=SV(I):D=Ø:B=L/2:NS=I:COL
    OR 1,SC(I):LOCATE X,Y
                        :REM*1Ø9
47Ø LOCATE SP(I);D       :REM*195
48Ø ON SD(I) GOSUB 9ØØ,93Ø,1Ø2Ø
    ,1Ø7Ø                :REM*1Ø3
49Ø NEXT                 :REM*245
5ØØ IF NS=Ø THEN RETURN:REM*143
51Ø INPUT"{CRSR DN}SNOWY BACKDR
    OP Y/N";M$           :REM*167
52Ø BG=M$="Y"            :REM*228
53Ø GOTO 76Ø             :REM*94
54Ø INPUT"{CRSR DN}LENGTH OF CH
    EVRON";A             :REM*186
55Ø SV(I)=ABS(A):IF A>B THEN 54
    Ø                    :REM*24
56Ø RETURN               :REM*1Ø8
57Ø INPUT"{CRSR DN}GENERATION 1
     OR 2";A             :REM*126
58Ø SV(I)=L/(1-(A>1))    :REM*12Ø
59Ø L=L*3:SZ(I)=L        :REM*74
6ØØ RETURN               :REM*148
61Ø PRINT"{CRSR DN}REPETITION:
    HOW MANY OF THESE"   :REM*2Ø
62Ø INPUT"1 TO 3";A      :REM*1Ø4
63Ø SV(I)=A AND 3        :REM*54
64Ø RETURN               :REM*188
65Ø GRAPHIC 1            :REM*146
66Ø OPEN 4,4,5:CMD4:PRINTCHR$(1
    Ø):SYS29ØØ:PRINT#4:CLOSE4:R
    ETURN                :REM*5Ø
67Ø GRAPHIC Ø,1          :REM*134
68Ø M$="HAPPY SHOVELING!":GOSUB
     146Ø                :REM*23Ø
69Ø END                  :REM*182
7ØØ NS=3:BG=1            :REM*7Ø
71Ø SD(1)=1:SD(2)=2:SD(3)=3
                        :REM*22Ø
72Ø SP(1)=55:SP(2)=4Ø:SP(3)=25Ø
                        :REM*21Ø
73Ø SZ(1)=55:SZ(2)=28Ø:SZ(3)=9Ø
                        :REM*132
74Ø SV(1)=25:SV(2)=5Ø:SV(3)=2
                        :REM*134
75Ø SC(1)=4:SC(2)=4:SC(3)=2
                        :REM*238
76Ø GRAPHIC 1,1:SCALE 1,999,8ØØ
                         :REM*18
77Ø IF BG THEN COLOR 1,2:FOR I=
    Ø TO 24:CHAR,RND(Ø)*39,I,"*
    ":NEXT               :REM*127
78Ø FOR HEADING=Ø TO 3ØØ STEP 6
    Ø                    :REM*91
79Ø COLOR 1,4            :REM*139
8ØØ FOR I=Ø TO 3:LOCATE X,Y:DRA
    W TO 3;I*9Ø:DRAW TO LA;HE:N
    EXT                  :REM*71
81Ø FOR SHAPE=1 TO NS    :REM*125
82Ø L=SZ(SH):LL=SV(SH) :REM*1Ø9
83Ø D=HE:B=L/2           :REM*87
84Ø COLOR 1,SC(SH)       :REM*13
85Ø LOCATE X,Y           :REM*161
86Ø LOCATE SP(SH);D      :REM*75
87Ø ON SD(SH) GOSUB 9ØØ,93Ø,1Ø2
    Ø,1Ø7Ø               :REM*163
88Ø NEXT:NEXT            :REM*119
89Ø RETURN               :REM*183
9ØØ DRAW TO L;D+3ØØ:DRAW TO LL;
    D:DRAW TO L;D+12Ø:DRAW TO L
    ;D+6Ø                :REM*245
91Ø DRAW TO LL;D+18Ø:DRAW TO L;
    D+24Ø                :REM*245
92Ø RETURN               :REM*213
93Ø IF L<LL THEN DRAW TO L;D:RE
    TURN                 :REM*79
94Ø L=L/4:D2=D           :REM*177
95Ø GOSUB 93Ø            :REM*243
96Ø FOR D=D+3ØØ TO D+3ØØ STEP 6
    Ø                    :REM*49
97Ø GOSUB 93Ø             :REM*7
98Ø NEXT                 :REM*225
99Ø DRAW TO L*3;D+6Ø      :REM*87
1ØØØ L=L*4:D=D2          :REM*135
1Ø1Ø RETURN              :REM*47
1Ø2Ø FOR J=1 TO LL:D=D+6Ø:GOSUB
     1Ø4Ø:D=D+24Ø:GOSUB 1Ø4Ø:D
    =D-3ØØ:DRAW TO B;D:REM*237
1Ø3Ø NEXT:RETURN         :REM*2Ø6
1Ø4Ø DRAW TO L;D:DRAW TO B;D-6Ø
    :DRAW TO B;D+12Ø:DRAW TO B
    ;D+6Ø:DRAW TO B;D+24Ø
                        :REM*198
1Ø5Ø DRAW TO B;D:DRAW TO L+B;D+
    18Ø                  :REM*166
1Ø6Ø RETURN               :REM*98
1Ø7Ø LOCATE L;D+6Ø:WIDTH 2
                        :REM*214
1Ø8Ø FOR J=1 TO LL:DRAW TO L*2;
    D+24Ø:LOCATE L;D:DRAW TO L
    *2;D+12Ø:LOCATE L+B;D
                         :REM*76
1Ø9Ø NEXT                 :REM*8Ø
11ØØ WIDTH 1:RETURN      :REM*44
111Ø GOSUB 122Ø          :REM*144
112Ø DO:READ M$           :REM*18
113Ø GOSUB 146Ø,MESSAGE:REM*1Ø4
114Ø LOOP UNTIL LEFT$(M$,3)="EN
    D"                   :REM*122
115Ø FOR I=29ØØ TO 2981 :REM*96
116Ø READ A:POKE I,A:NEXT
                        :REM*114
117Ø INPUT M$             :REM*88
118Ø FOR I=1 TO 25       :REM*188
119Ø PRINTCHR$(27)"W{HOME}"TAB(
    RND(Ø)*39)"*"         :REM*6
12ØØ NEXT                :REM*19Ø
121Ø CHAR,Ø,24:RETURN    :REM*44
122Ø COLOR Ø,1:COLOR 4,7
                        :REM*188
123Ø X=499:Y=4ØØ:LA=33Ø :REM*26
124Ø G$=CHR$(7):PRINTG$:REM*1Ø2
125Ø FOR I=Ø TO 4:READ C(I)
                         :REM*Ø
126Ø NEXT:RETURN         :REM*18Ø
127Ø DATA2,4,7,14,15      :REM*4
128Ø DATA"{CRSR DN}DATELINE:"
                        :REM*211
129Ø DATA"{3 SPACEs}BAFFIN ISLA
    ND, NORTHWEST TERRITORIES"
                        :REM*1Ø1
13ØØ DATA"{3 SPACEs}DECEMBER 25
    , 1987"              :REM*123
131Ø DATA"{CTRL 4}{CRSR DN}YOUR
     ORDER OF SNOWFLAKES IS AL
    MOST"                :REM*87
132Ø DATA"READY. DUE TO PRODUCT
    ION LIMITATIONS," :REM*2Ø5
133Ø DATA"NO TWO WILL BE ALIKE.
    "                    :REM*243
134Ø DATA"{CRSR DN}YOU CAN DESI
    GN CUSTOM FLAKES, OR"
                        :REM*189
135Ø DATA"SELECT A RANDOM AVALA
    NCHE."               :REM*119
136Ø DATA"{CRSR DN}SNOWFLAKES C
    AN BE DELIVERED TO AN"
                        :REM*187
137Ø DATA"EPSON/STAR COMPATIBLE
     PRINTER,"           :REM*251
138Ø DATA"TO CUT OUT & COLOR."
                        :REM*121
139Ø DATA"{CTRL 2}{CRSR DN}PRES
    S RETURN FOR SNOW..."
                        :REM*137
14ØØ DATA"END OF MESSAGE."
                        :REM*113
141Ø DATA16Ø,32,132,251,16Ø,Ø,1
    32,25Ø,16Ø,25,132,252,16Ø,
    Ø,185,157,11,32,21Ø:REM*57
142Ø DATA255,2ØØ,192,9,2Ø8,245,
    16Ø,4Ø,132,253,16Ø,7,177,2
    5Ø,162,7,42,118,166
                        :REM*177
143Ø DATA2Ø2,16,25Ø,136,16,243,
    169,7,17Ø,56,1Ø1,25Ø,133,2
    5Ø,144,2,23Ø,251    :REM*37
144Ø DATA181,166,32,21Ø,255,2Ø2
    ,16,248,198,253,2Ø8,217,19
    8,252,2Ø8,196,96   :REM*147
145Ø DATA27,65,8,13,1Ø,27,75,64
    ,1                  :REM*197
146Ø FOR I=1 TO LEN(M$)  :REM*3
147Ø PRINT"{CTRL 9}*{CRSR LF}{C
    TRL Ø}";:SOUND1,6ØØØØ,1,,,
    ,3                   :REM*235
148Ø PRINTMID$(M$,I,1);:J=4:NEX
    T                    :REM*31
149Ø PRINT G$:J=81:RETURN
                        :REM*227 ■
```

Superscript Solution

If your printer could not produce superscripts with RUN Script before, it can do so now with this technique.

By CHARLES LEWIS

One of the advantages of RUN Script, *RUN*'s word processor for the C-64 and C-128 (March and December 1986 issues), is its provision for sending special formatting commands to the printer, using macro characters. These characters are created by the Define Macros accessory program to RUN Script (April 1986 and January 1987 issues).

One application of this feature is printing superscripts—characters raised above the baseline of the type, as in footnote references. However, Define Macros can't produce superscripts if your printer doesn't support superscripts and subscripts, which is true of many letter quality printers and some of the less expensive dot matrix printers.

When you need to print out a document that includes footnotes, this limitation is a real problem, because it leaves no way to include the footnote reference numbers in the text. There is a way around this problem, however, using RUN Script's option to print to disk rather than to the printer. Printing your document to disk will create a sequential file with blank lines between the text lines. When you read the file back into memory, the blank lines will appear on the screen, and you can use them to set up footnote reference numbers, using the procedure described below. The final printout of your document will be double-spaced, with the footnote numbers located in the intervening lines. This technique works with RUN Script and virtually any printer.



The Procedure

To create the footnote numbers, first type in the text of your document with the numbers included as normal numbers in the text lines. Place each number immediately after the preceding letter or punctuation mark; don't leave any space between.

When you've finished entering the document, use the RUN Script dot commands to set the margins as you normally would and to specify double spacing (i.e., .ls1).

Now print out your document and proofread it. Be sure to read carefully so you'll catch everything you might want to change, because making any changes later will be difficult.

Once you're satisfied with the document, press F1 and P to print. Normally you'd print to device 4 or 5, the printer, but this time you must print to device 8 or 9, the disk drive. When prompted for a filename, add ,w to the name (filename,w), so RUN Script won't try to read the file instead of writing it and give you a File Not Found error. You'll end up with a "printed" sequential file on disk.

Now enter F1 and R to read the file back into memory. If you're using RUN Script 128 and an 80-column screen, the document will appear as it will print out—double-spaced, with the left and right margins set properly. If you're using RUN Script 64, the display won't resemble the printout, because the screen is only 40 columns wide. However, there will be a blank line between each two display lines of text.

Move the cursor to the carriage return on the blank line above the first text line containing a footnote number. Switch to Insert mode and use the space bar to insert spaces until the cursor is immediately above the number. Then type the number on the blank line.

Now switch out of Insert mode, move the cursor to the original number and use the space bar to erase it. Don't use the delete key, or you might change the margins and end up with the footnote number over a letter rather than over a space.

RUN Script 64 users must bear in mind that if the original number appears in the second line of text, after the wraparound, enough spaces must be inserted to create a second blank line, as below:

```
                                  1
          2—
This is material that has been    printed in
the manner    indicated. When it is
                        3
          4—
printed, footnotes     will be located in the
right places.
```

Continue this process for each footnote number. Unless you have a lot of numbers in the text itself, you can save time by using the F2 search-and-replace function to locate the original numbers.

Once you've finished making the changes, move to the top of the document and set the margins as follows:

```
.lm1.rm1.tm1.bm1
```

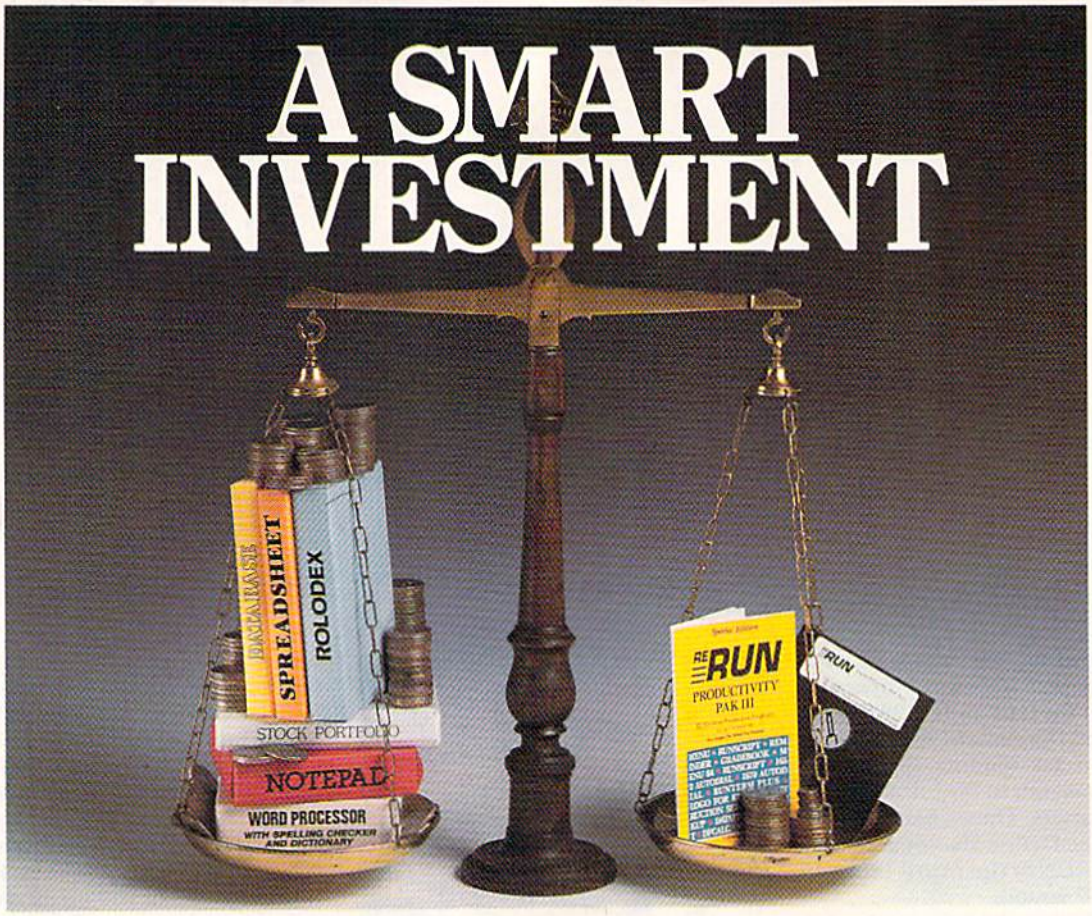
These settings will keep RUN Script from changing the margins that were set when you printed to disk earlier.

Now save the revised document and print it. The footnote numbers will be placed in their correct locations, above the text lines. ■

Charles Lewis is a high school English teacher. He programs computers and writes in his free time.

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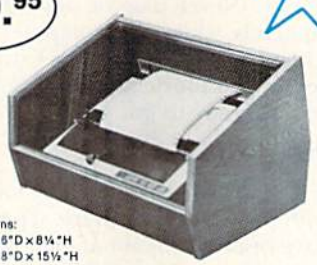
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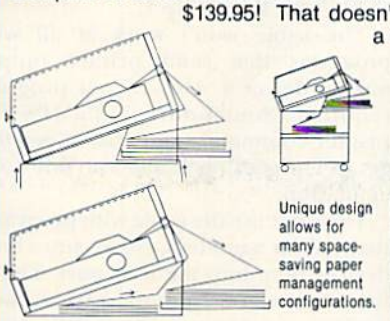


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GEOWATCH

The Commodore 1351 mouse, Berkeley's geoPrint Cable and the Tymac Connection all work with GEOS—to varying degrees.

By MATTHEW STERN

I had hoped to review a new GEOS-compatible education program this month, but my computer system had other ideas—both my 1541 disk drive and my RGB monitor called in sick. I depend on my computer a lot, so it's frustrating when it doesn't work right.

With hardware problems on my mind, I decided to show you how to avoid difficulties with the new Commodore 1351 mouse. I'll also review Berkeley Softworks' first hardware product, the geoPrint Cable, and dip into the geoWatch mail bag for information from a reader on another GEOS-compatible printer interface.

GEOS AND THE 1351 MOUSE

I bought my Commodore 1351 mouse two months ago, and so far, I've been quite pleased with it. It's very responsive, and its sculpted case fits well in my hand.

As you'd expect, the mouse's proportional movement helps me create better geoPaint pictures, but I've also found that its design helps me with geoWrite. Instead of taking both hands off the keyboard to reach for the joystick, I can keep one hand on the keys and move the mouse with the other. Since I've used other mouse-controlled machines like the Apple Macintosh and the Atari ST, I'm accustomed to this technique and find it a more comfortable way to write.

I have only one warning about the 1351 and GEOS: *Don't use the driver installation program included with the mouse!* That program has bugs, and some users have told me it can render a GEOS boot disk useless. A safer and easier way to configure GEOS for the 1351 is to copy the drivers to your boot disk, using the following procedure:

1. Check the back of your newer GEOS disks (Writer's Workshop, geoFile, and so forth) for the Commodore 1351 mouse driver and deskTop 1.3. (These files are also available on QuantumLink.) You need deskTop 1.3 to use the 1351; the mouse driver won't work with deskTop 1.2.

2. Plug your joystick into port 1 and boot GEOS, then use the Backup program to copy the files on your GEOS boot disk to another disk. Backup is designed especially for this purpose. You can't boot the copy, but you can use it to restore the files back to your boot disk, if necessary. You should always make a copy of the files on your boot disk before modifying them.

3. Throw the old deskTop icon into the trash can icon and copy the deskTop 1.3 icon to your boot disk.

4. Copy the Commodore 1351 driver to your boot disk, so it's the first input device driver listed in your disk notepad.

5. Quit GEOS and turn off your machine, then plug your 1351 mouse into port 1. (Never plug or unplug any peripherals while the computer is on.) Then run GEOS. The 1351 driver will come up as the default, and your mouse will be ready to go.

THE GEOPRINT CABLE

So far, I've been generally impressed with Berkeley's software. However, I have reservations about their first hardware release—the geoPrint Cable.

The cable arrived in my mailbox just as my three-year-old Cardco Card?/G+ interface decided to take an extended convalescence. Since I was stuck without a printer interface, I decided to give the geoPrint Cable a try.

The cable itself seems well made. It's six feet long, so your printer doesn't have to be right next to your computer. There's a metal Centronics parallel printer connector at one end and a plastic connector for Commodore's user port at the other. The user port connector has a plastic tab, so it fits only one way and you can't accidentally stick it into your computer upside down. There's no interface box, so you don't have to worry about any circuitry failing on you, either.

The geoPrint Cable comes with a disk of printer drivers. You select the appropriate driver for your printer and copy it to your boot and work disks. A one-page sheet serves as the user's manual, but I didn't really need it to set up the cable with GEOS. There's no need to fiddle with switch settings, nor to turn the linefeed on or off.

The cable works well with GEOS, printing my files flawlessly. As for Berkeley's claim that it "speeds up your printing process," my data seems to go to the printer slightly faster with the geoPrint cable than with my Cardco G+, but not much. (If the cable had a printer buffer on it, the story would be different.)

If GEOS were the only program I used on my Commodore, I might be completely satisfied with the geoPrint Cable. However, this is not the case. For example, I do word processing with PaperClip II.

Here, the documentation sheet leaves me completely on my own, and I've found that I can't just choose parallel as my printer port selection and start printing. I first have to initialize the user port by selecting RS-232 for printer type and pressing the Print command. At this point, the file will preview on the screen, but it still won't print, so I have to go back and change the printer port to parallel and print again. This configuration routine is a kludge, but it's the only way I can use the geoPrint Cable with PaperClip II.

The cable won't work at all with programs that send printer output only to device 4. Also, if your program requires Commodore 1525/MPS-801 printer commands and characters, forget it. The geoPrint Cable can't do 1525 emulation.

You can't use the cable with programs that call for a modem, either, since both devices plug into the user port. Therefore, you can't use your printer with geoDex and QuantumLink. Whenever you have the geoPrint Cable plugged in and need to use your modem, you have to unplug the cable and plug in your modem interface. Not only is this inconvenient, but it can wear out the user port connectors.

The geoPrint Cable's redeeming features are that it's easy to install, it works well with GEOS and it seems a little faster and more reliable than the average printer interface. However, I don't recommend it if you're an average

Commodore user, especially if you have a modem. A better choice would be a serial printer interface with a buffer.

An Interface Alternative

One printer interface you might want to consider is the Tymac Connection.

SteveE4 on QuantumLink reports that this interface is compatible with GEOS, and he explains that to use it, you need to "send some commands to take care of some defaults." Steve wrote this short program to set up the necessary configuration:

```
1 REM TYMAC CONNECTION INTER
  FACE PROGRAM FOR GEOS
2 REM BY STEVEE4
10 OPEN 1,4: REM OPEN PRINTER
   CHANNEL FOR DEVICE 4
20 PRINT #1,CHR$(27)"W"CHR$(00):
   REM TURN OFF WIDTH DEFAULT
30 PRINT #1,CHR$(27)"L": REM TURN
   OFF AUTO LINEFEED
40 PRINT #1,CHR$(27)"*6": REM LOCK
   INTO TRANSPARENT MODE
```

Coming Up: GEOS Holiday Shopping Guide

Do you have a GEOS user on your holiday shopping list, or do you want to drop some hints for yourself? Next month, I'll give you some suggestions for distinctly GEOS gifts. You'll find stocking stuffers, books, hardware and last-minute holiday goodies. Keep watching! ■

The monthly geoWatch column addresses the needs of RUN *readers who use GEOS, Berkeley Softworks' alternative operating system for the C-64 and C-128. Your questions and comments are welcome. Send them to:*

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



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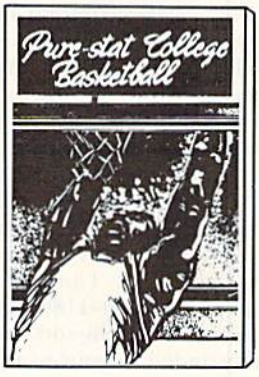
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EASY APPLICATIONS

SUPER SORT: Sort your string, floating point or integer arrays in the wink of an eye.

By MICHAEL BROUSSARD

If you write Basic programs, sooner or later you'll be faced with the chore of sorting arrays—lists of names, for example. My all-purpose sorter, called Super Sort, can be used as a subroutine in your own programs to sort any type of array.

Super Sort is short (only 332 bytes) and fast, especially when sorting large numbers of strings. In one test I ran, Basic took nearly 29 minutes to sort 600 strings, while Super Sort did them in 41 seconds—42 times faster than Basic! Table 1 shows the relative speed of Super Sort compared to Basic when sorting various lists of 600 elements.

For a demonstration of Super Sort, type in the program in Listing 1, using 64 Perfect Typist. Be sure to save a copy to disk before you run it, because the program is sensitive to typing errors. A single mistake could lock up the computer, and you'd lose the program.

Line 100 is the important part of the program; it pokes the machine language subroutine into the proper memory locations. The Data statements numbered 1000–1180 define the subroutine. To use the sort, these lines must be included in your own program.

Once it's been poked into memory, the sort is invoked with a SYS statement like this:

```
SYS SRT,X(1),100
```

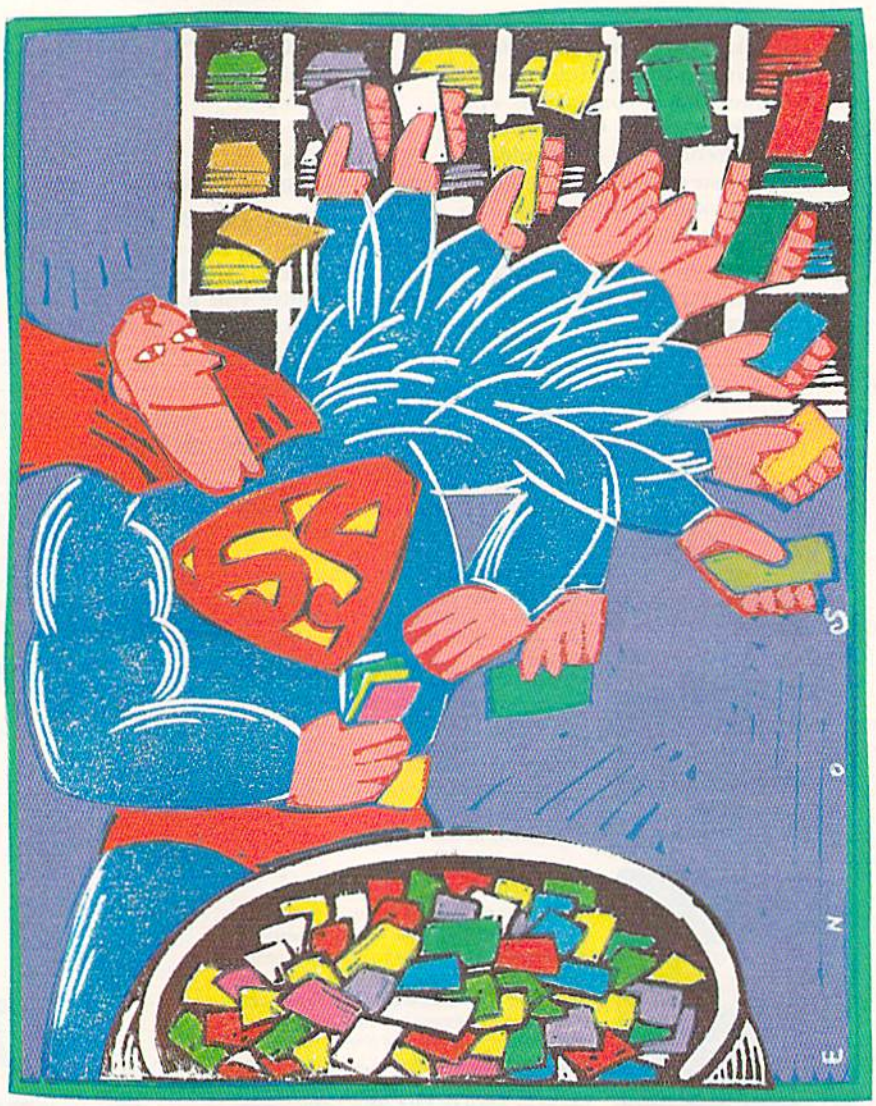
SRT represents the starting address of the machine language subroutine (in either variable or numeric form); X(1) means the sort should start with the first element of the array; and 100 indicates the number of elements in the array.

To sort only part of the array, use a statement like the following:

```
SYS SRT,X(21),10
```

This example would sort elements 21–30.

For Super Sort to work properly, you must specify which element of the array it should start with, because X and X(1) are different variables as far as Basic is concerned. One is a single floating-point variable, and the other is an array. Attempting to sort a nonarray value may corrupt other variables in your program, and even lock up the computer.



Similarly, don't try to sort 200 elements of an array dimensioned for 100 elements. Super Sort will obligingly attempt to sort past the end of the array, with potentially disastrous results.

If you're sorting an array of strings, you can specify which character of the ►

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string should be the starting point for comparison. For example,

SYS SRT,X$(1),100,3

specifies that the first 100 elements of array X$ are to be sorted, beginning with the third character of each string. Any strings less than three characters long are sorted to the beginning of the array in arbitrary order. If you don't specify a starting character position for the sort, Super Sort defaults to the first character. Bear in mind that the concept of starting position holds true only for string arrays. The following statement will generate a syntax error, because N is not a string array:

Table 1. Speed comparison, in minutes and seconds, between Basic and Super Sort, sorting lists of 600 elements.

Element type	Basic	Super Sort
String	28:42	00:41
Floating Point	25:46	02:45
Integer	26:58	03:34

SYS SRT,N(1),100,2

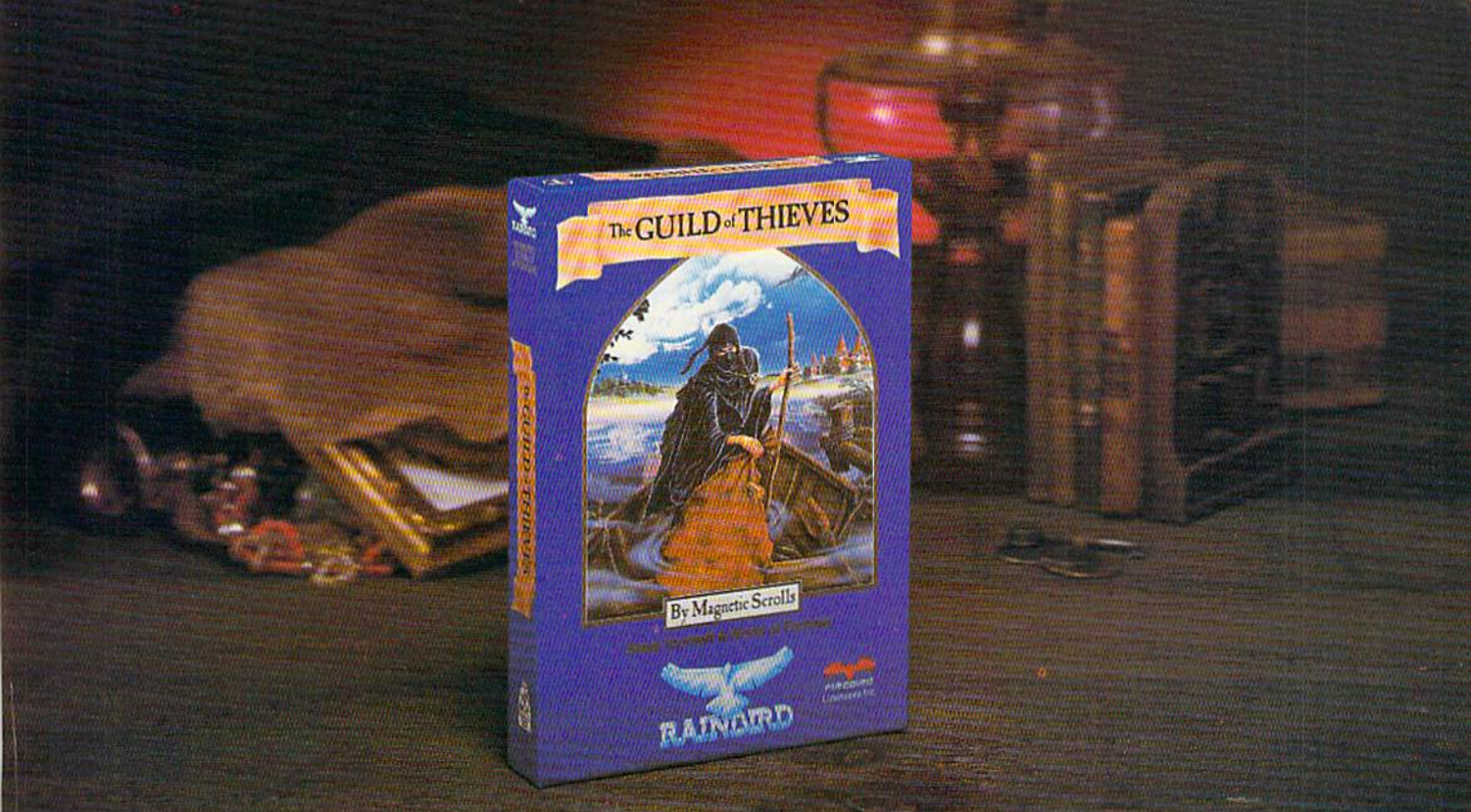
As a bonus, Super Sort is completely relocatable. You can place it anywhere in memory just by changing the value assigned to SRT on line 100. Just be sure to use a memory location that doesn't interfere with Basic.

To keep Super Sort as short as possible, I used many subroutines that are part of the C-64's Basic ROM. For this reason, the program will run only on a C-64 (or a C-128 in 64 mode). It uses the following zero-page locations for temporary storage: 7, 8, 20, 21, 25–32 and 251–254. R

Michael Broussard is a systems engineer for Stratus Computer, a manufacturer of fault-tolerant super-minicomputers.

Listing 1. Super Sort program.

```
Ø REM SORTER PROGRAM BY M. BROU
  SSARD                    :REM*15Ø
1ØØ SRT=5ØØØØ:FORK=SRTTOSRT+331
    :READN:C=C+N:POKEK,N:NEXT
                           :REM*1Ø4
11Ø IF C<>42632 THEN PRINT"ERRO
    R IN DATA STATEMENTS!":END
                           :REM*234
12Ø DIM X$(1Ø),X%(1Ø),X(1Ø)
                           :REM*134
13Ø PRINT"{SHFT CLR}PRESS ANY K
    EY TO SEE STRING SORT"
                           :REM*92
14Ø GETA$ : IF A$="" THEN 14Ø
                           :REM*18
15Ø PRINT"{CRSR DN}THE UNSORTED
     STRINGS ARE:"         :REM*62
16Ø FOR K=1 TO 1Ø : READ X$(K)
    : PRINT TAB(1Ø);X$(K) : NEX
    T K                    :REM*162
17Ø SYS SRT,X$(1),1Ø       :REM*28
18Ø PRINT"THE SORTED STRINGS AR
    E:"                    :REM*54
19Ø FOR K=1 TO 1Ø : PRINT TAB(1
    Ø);X$(K) : NEXT K      :REM*22
2ØØ PRINT"{CRSR DN}PRESS ANY KE
    Y TO SEE INTEGER SORT"
                           :REM*11Ø
21Ø GETA$ : IF A$="" THEN 21Ø
                           :REM*182
22Ø PRINT"{CRSR DN}THE UNSORTED
     INTEGERS ARE:"        :REM*166
23Ø FOR K=1 TO 1Ø : READ X%(K)
    : PRINT TAB(1Ø);X%(K) : NEX
    T K                    :REM*25Ø
24Ø SYS SRT,X%(1),1Ø       :REM*1ØØ
25Ø PRINT"THE SORTED INTEGERS A
    RE:"                   :REM*66
26Ø FOR K=1 TO 1Ø : PRINT TAB(1
    Ø);X%(K) : NEXT K      :REM*95
27Ø PRINT"{CRSR DN}PRESS ANY KE
    Y TO SEE FLOAT NUMBER SORT"
                           :REM*2Ø7
28Ø GETA$ : IF A$="" THEN 28Ø
                           :REM*191
29Ø PRINT"{CRSR DN}THE UNSORTED
     FLOAT VALUES ARE:":REM*177
3ØØ FOR K=1 TO 1Ø : READ X(K) :
     PRINT TAB(1Ø);X(K) : NEXT
    K                      :REM*19
31Ø SYS SRT,X(1),1Ø        :REM*221
32Ø PRINT"THE SORTED FLOAT VALU
    ES ARE:"               :REM*69
33Ø FOR K=1 TO 1Ø : PRINT TAB(1
    Ø);X(K) : NEXT K       :REM*2Ø7
34Ø PRINT"{CRSR DN}PRESS ANY KE
    Y TO SEE OFFSET STRING SORT
    "                      :REM*19
35Ø GETA$ : IF A$="" THEN 35Ø
                           :REM*1Ø1
36Ø INPUT"SORT ON WHICH CHARACT
    ER";N                  :REM*189
37Ø PRINT"{CRSR DN}THE UNSORTED
     STRINGS ARE:"         :REM*27
38Ø FOR K=1 TO 1Ø : READ X$(K)
    : PRINT TAB(1Ø);X$(K) : NEX
    T K                    :REM*127
39Ø SYS SRT,X$(1),1Ø,N     :REM*93
4ØØ PRINT"THE SORTED STRINGS AR
    E:"                    :REM*19
41Ø FOR K=1 TO 1Ø : PRINT TAB(1
    Ø);X$(K) : NEXT K      :REM*243
1ØØØ DATA 32,253,174,32,139,176
     ,133,251,132,252,165,13,2Ø
     1,255,24Ø,12,165      :REM*1Ø7
1Ø1Ø DATA 14,2Ø8,4,169,5,2Ø8,6,
     169,2,2Ø8,2,169,3,133,53,3
     2,121,Ø,2Ø1,44        :REM*67
1Ø2Ø DATA 24Ø,9,162,11,2Ø8,2,16
     2,14,76,55,164,32,131,174,
     32,17Ø,177,2Ø1        :REM*81
1Ø3Ø DATA 128,176,241,132,25,13
     3,26,165,53,2Ø1,3,2Ø8,29,1
     69,Ø,133,2Ø,32        :REM*86
1Ø4Ø DATA 121,Ø,2Ø1,44,2Ø8,18,3
     2,131,174,32,17Ø,177,132,2
     Ø,133,21,165,21       :REM*72
1Ø5Ø DATA 2Ø8,2Ø6,132,2Ø,198,2Ø
     ,165,25,2Ø8,5,165,26,2Ø8,1
     ,96,165,25,133,7      :REM*54
1Ø6Ø DATA 165,26,133,8,165,251,
     133,253,165,252,133,254,16
     5,7,2Ø8,2,198,8       :REM*228
1Ø7Ø DATA 198,7,2Ø8,29,165,8,2Ø
     8,25,165,25,2Ø8,2,198,26,1
     98,25,24,165,251      :REM*58
1Ø8Ø DATA 1Ø1,53,133,251,165,25
     2,1Ø5,Ø,133,252,169,1,2Ø8,
     192,24,165,253        :REM*252
1Ø9Ø DATA 1Ø1,53,133,253,165,25
     4,1Ø5,Ø,133,254,16Ø,Ø,165,
     53,2Ø1,5,2Ø8,2        :REM*96
11ØØ DATA 24Ø,83,2Ø1,2,2Ø8,2,24
     Ø,1Ø8,177,251,133,27,2Ø9,2
     53,144,4,177,253      :REM*144
111Ø DATA 133,27,197,2Ø,144,186
     ,56,229,2Ø,133,27,2ØØ,177,
     251,133,29,177        :REM*232
112Ø DATA 253,133,31,2ØØ,177,25
     1,133,3Ø,177,253,133,32,16
     4,2Ø,177,29,2Ø9       :REM*128
113Ø DATA 31,144,7,176,9,2ØØ,19
     8,27,2Ø8,243,169,Ø,24Ø,13Ø
     ,16Ø,Ø,177,251        :REM*68
114Ø DATA 72,177,253,145,251,1Ø
     4,145,253,2ØØ,196,53,144,2
     41,176,233,165        :REM*25Ø
115Ø DATA 251,164,252,32,162,18
     7,32,15,188,165,253,164,25
     4,32,162,187,169      :REM*12
116Ø DATA 4,133,18,24,32,22,176
     ,165,98,24Ø,2Ø8,2Ø8,2Ø2,2Ø
     Ø,177,251,133,2       :REM*1Ø
117Ø DATA 136,177,251,164,2,32,
     145,179,32,15,188,2ØØ,177,
     253,133,2,136         :REM*1Ø6
118Ø DATA 177,253,164,2,32,145,
     179,169,1,2Ø8,2Ø9,32
                           :REM*238
2ØØØ DATA HORSE,ZEBRA,GORILLA,C
     AT,AARDVARK,QUAIL,SNAKE,CO
     W,DOG,HIPPOPOTAMUS:REM*2Ø1
2Ø1Ø DATA 123, 789, 456, Ø, -23
     45, 999, 6, 12345, -1,1
                           :REM*25
2Ø2Ø DATA 1.23, 78.9, 2.13E15,
     -46.443, Ø, 12, -55E-12, 6
     6.5, -66.5, 213       :REM*5
2Ø3Ø DATA HORSE,ZEBRA,GORILLA,C
     AT,AARDVARK,QUAIL,SNAKE,CO
   W,DOG,HIPPOPOTAMUS:REM*231 ■
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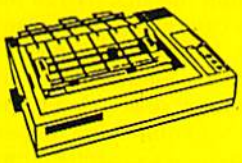
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TELECOMPUTING WORKSHOP

This month: The Aprotek 12C, Mercury and TCM-1200H modems; compacting program time trials; fixing a modem cable with broken tabs; and more.

By DAVID BRADLEY

I'VE RECEIVED A NUMBER of letters asking for advice on using the Aprotek 12C modem (from Aprotek, 1071-A Avenida Acaso, Camarillo, CA 93010), but I haven't been able to help much, because I didn't have one. Now I finally do, and I've been checking it out. The Aprotek 12C is the same as the Volks 6480, and it's a fine modem, but it simply doesn't work like any other modem on the market, so software support for it is sparse. Two public domain programs I've recently found for the Aprotek 12C/Volks 6480 are Multiterm 5.2, with a special boot program called 6480 Multiterm, and ST/R Terminal.

—If you're looking for an inexpensive, good-quality Hayes-compatible 300/1200 modem that will work with both a C-64 and a C-128 and also with an Amiga or PC-10, check out the Mercury modem from Computer Friends (14250 NW Science Park Drive, Portland, OR 97229). It sells for just $149 and is 100 percent Hayes-compatible.

Computer Friends doesn't sell an RS-232 interface for the C-64 and C-128, but Aprotek (address above) has a good one for just $39.95, plus $3 shipping and handling. I like the Aprotek interface, because, in addition to providing an RS-232 port, it extends the user port. For some, this feature is very important.

—Another inexpensive, good-quality Hayes-compatible 300/1200 modem to use with a C-64 or C-128 is the TCM-1200H, from Trans Comm, Inc. (703 Annoreno, Suite 13, Addison, IL 60101). Unlike most Commodore-specific modems, this one doesn't stick out of the user port and take up a lot of desk space. Instead, it comes with a user port connector and a three-foot cable that goes into the back of the modem, so you can keep it on top of your monitor or disk drive, or anywhere else within three feet of the computer.

The TCM-1200H also comes with eight LED indicators, plus eight DIP switches on the back, so you can get at them with ease. Most Hayes-compatible modems have the DIP switches inside, under the front plate, so that making changes requires opening the case.

Another important feature of the TCM-1200H is its support of Bell 103/212 as well as CCITT V.22/V.21. If you ever spend time in a country that uses a CCITT phone system, all you have to do is flip one DIP switch or send one command, and you'll be ready to telecommunicate. Watch for more information about this gem of a modem in upcoming columns.

—Many people who are tired of having to buffer incoming text and then save it to disk have written in asking for a terminal program for the C-64 and C-128 that will let them save data directly to disk. I know of no terminal programs that will do this, because the interrupts that handle sending and receiving via the modem and the interrupts that handle writing to disk will lock each other up if they try to work at the same time.

The only solution to this problem I've found is to use a terminal program that sends an X-Off (stopping transmission from the computer you're calling in most cases), then saves the information stored in the buffer, and then sends an X-On to continue the flow of incoming text. A commercial program that does this is Sixth Sense, and a public domain program that does it is ThirdTerm. If this method won't work for you, the PET/CBM computers are capable of dumping information directly to disk. You'll need a PET, an IEEE disk drive (a Commodore 4040 or 8050, for example), an RS-232 modem, an IntelCom-type cable and an IntelCom-type terminal program.

Modem-Phone Line Security

Disconnecting your modem from the phone line during electrical storms is an excellent idea, but there is one bad side effect of this constant plugging and unplugging. The little tabs on the ends of the cable tend to break off, and it's then all too easy to accidentally pull the phone line out of the modem or the wall when you're online. Of course, this usually happens when you've downloaded 99 percent of a 400-block file from a pay system.

Before you get out the Scotch tape, go to your local hardware store and see if they have a modular-plug crimping tool and some modular outlet plugs. I just bought one of these tools, and it's a life saver! The model I got has a wire-stripping section and a crimping section. One of the sweetest sounds I hear now is the "click" of a secure telephone connection before I go online.

If you can't find one of these tools in your area, write to Gemini Industries, Inc., 215 Entin Rd., Clifton, NJ 07014. By the way, the crimper and ten outlet plugs cost me less than $10.

Internal Modems?

A lot of people have left me mail on Q-Link recently, including many who want to know the difference between internal and external modems. I don't understand what has prompted all the questions, because I don't know of any internal modems for the C-64 or the C-128. I do know that computers like the PC-10 can be outfitted with an internal modem, and I know that some people have mounted modems inside their C-64s or 128s, but I'm aware of no production internal 64/128 modems.

In any case, you'll get the same quality from an internal or external modem. Most internal modems take power from the computer, so you don't need to find another wall outlet, but, depending on your system, it's possible (although unlikely) that you'll need a stronger power supply.

One nice thing about an external modem is that you can use it on various machines, as long as you have the proper interface. An internal modem for the PC-10 can be used with other IBM-compatibles, but not with a C-64 or C-128.

—In my "Plugging Into Telecommunications" article in last September's issue, I mentioned that Jo-Anne Park of Toronto had made an interface that enabled her to use her Commodore 1670 modem with her Amiga. At that time, I didn't know of a company that sold such a device, but now I do. LRA Enterprises (35615 Ave. D, Yucaipa, CA 92399) sells

one for $44.95. When ordering, be sure to tell them if you want a male or female RS-232 connector on the interface, and make your check payable to Lawrence R. Anderson.

—If you're looking for a VT100 terminal emulator for your C-64, an update to the public domain Kermit program I mentioned in last April's column offers this feature. When I wrote the April column, I thought the program already supported VT100, but I was mistaken; the current version at that time was only a VT52 emulator.

—Prompted by all the discussions I've seen online about which file-compacting program is best, I've done some experiments with Arc, Lynx and Library (which I mentioned in the August issue). I tested all three programs for creating one file out of a 113-block program file and a 74-block sequential file that included documentation. Table 1 summarizes my findings.

As you can see, Lynx won hands down for file-creation time. It beat Library by 6 minutes and 40 seconds and Arc by 7 minutes.

Arc won in the compressing department, reducing the file by 55 blocks. At 300 baud and using Punter protocol, 55 blocks equals 9.16 minutes of download time. Using Arc and 300 baud, you could download and break up the file about 2 minutes and 20 seconds faster than you could with Lynx. However, at 1200 baud, that 55 blocks represents only 2.6 minutes of download time. So, using 1200 baud and Lynx, you could download and break up the file about 4 minutes and 20 seconds faster than you could with Arc.

My opinion is that each of these programs has its own strengths, and one can't be called generally superior to another. But I would like to hear what you have to say. If you use any of these programs, please write to tell me which one you prefer, and why. I'm also interested in your experiences, good or bad, with any of these programs. In a few months, I'll tabulate and post the results of my survey, as well as some of the comments I receive.

—Alex Dominguez has written in response to a letter in the July issue from Dennis McNelis, who asked whether his 1541 disk drive could be burned out if a user on his BBS hung up at the wrong moment during a disk access. Mr. Dominguez reports that a couple of his friends had their drives damaged by thoughtless users. He offers no solution to the problem; he just urges users of BBSs to be responsible and treat the BBS equipment as if it were their own.

Now on to this month's questions and answers.

Table 1. Comparative performances of file-combining programs.

Program	Starting Block Size	Ending Block Size	Elapsed Time
Lynx XI	187	188	55
Arc 230	187	132	475
Library 9.0	187	187	455

Q *On page 85 of the May issue of* RUN, *I saw an ad for the Aprotek 1200C, a Hayes/Commodore-compatible 1200-baud modem. It looked good, so I started saving up for it. Then, in the very next issue, Aprotek advertised another 1200-baud modem, the 12C.*

In addition to being Hayes/Commodore-compatible, the 1200C was described as having a built-in speaker and eight status LEDs, and supporting direct connects, autodial and autoanswer, and tone/pulse switching. The 12C was described as easy to set up; supporting autoanswer and autodial, tone/pulse switching and direct connects; and packaged with the ComTerm 64 terminal software.

I'd like to know whether Aprotek still carries the 1200C and, if not, whether a similar modem is available elsewhere. I'd also like to know if the 12C is just another modem like the Volks 6480 (not compatible with anything).

—Michael Cheu
Ridgeway, Ontario, Canada

A The Aprotek 12C *is* just like the Volks 6480 (as I mentioned above), and Aprotek no longer seems to have the 1200C any more. Another modem that's similar to the 1200C is the TCM-1200H, which I also mentioned above.

Q *I want to use my Racal-Vadic VA3451P modem with my C-128, but I don't know where to get the RS-232C interface I need. It's an excellent modem, and I'd hate to replace it with one I probably wouldn't like as well, just because I can't get an interface.*

—Reynold Wong
Pacific Grove, CA

A Aprotek's (address above) universal RS-232 interface, which costs $39.95, should do the job. To make sure, before you buy it, write Aprotek and describe your requirements to them.

Q *I'm having trouble joining Q-Link. I called their 800 number (800-392-8200) and ordered the $39.80 package that includes a four-month membership and a Commodore 1660 modem. I charged it to my VISA card. Since then, I've received four calls from Q-Link. Each time they've told me that due to a computer error, they've lost my order.*

Is there any way to get the Q-Link software from another source, and, if so, is Q-Link worth the time, effort and money?

—Lloyd J. Robinson, Jr.
Tuscaloosa, AL

A If you were to go out and buy a Commodore 1660 or 1670 modem from a dealer, you'd find the Q-Link software in it. That package would cost more than $39.80, but at least you'd have what you need.

Most manufacturers of Commodore- ►

compatible modems bundle the Q-Link software these days. I know the TCM-1200H and Aprotek 12C come with it. Q-Link software also accompanies the Commodore 64C, but it's not worth buying another computer to get it.

I think once you do get a modem and software and get on Q-Link, you'll find it worth the time, effort and money. Q-Link is easy to use, and when you're just starting out in the world of telecomputing, the easier the better.

You might consider getting a 1200-baud modem, such as the TCM-1200H, as Q-Link charges the same for 1200 as it does for 300 baud. If you downloaded files for ten hours at 1200 baud, you'd save about 30 hours of plus time, or about $108 (30 × $3.60), over 300 baud.

Q *When I bought my Mitey Mo modem, I remember the ad saying it would handle up to 1200 baud. I am, indeed, given the option of 1200 baud when I'm setting up the modem, but a note in the owner's manual says, "Mitey Mo can accommodate up to 300 baud. Disregard the 600 and 1200 choices that appear." Can I upgrade my modem to handle 1200 baud?*

—GLENN CORBETT
VISALIA, CA

A I haven't seen that ad, but I suspect they said the software included with the modem could handle 1200 baud, even though the modem cannot. Regardless, I know of no way for you to upgrade your Mitey Mo to 1200 baud.

TIPS OF THE MONTH

If you're new at telecomputing and there are things you don't know, don't be afraid of looking stupid—go ahead and ask for help. After all, everybody started out just where you are, and I find people love to share their telecomputing experiences. Besides, if you don't ask, you're the one who loses out.

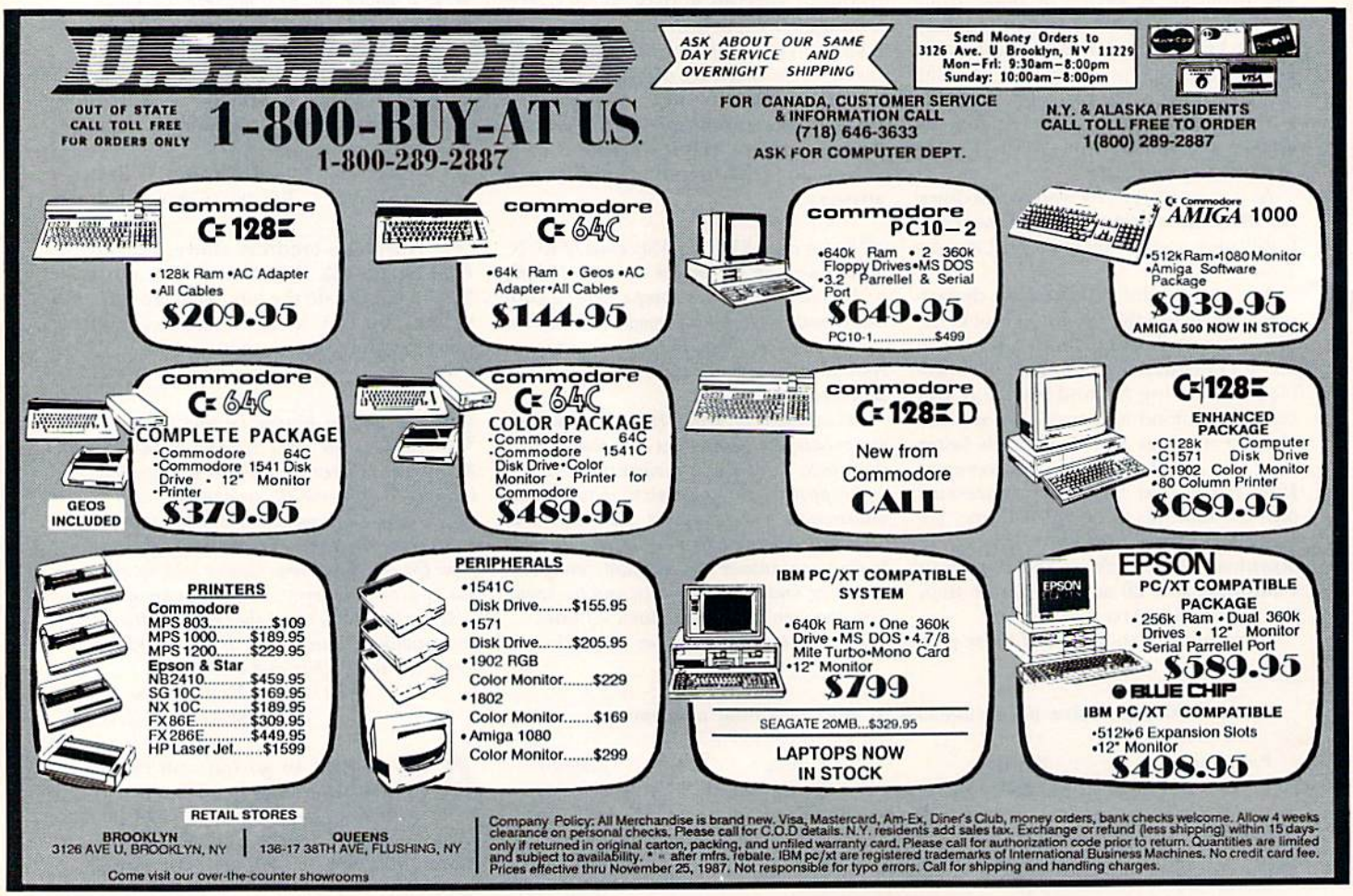
As I've mentioned in previous columns, when a thunderstorm may come your way, you should unplug your modem from your phone line and unplug your computer system from the wall. I want to reemphasize that warning. Until I moved to Florida, I had no idea how many people suffer severe damage to their systems from lightning.

Remember, besides questions, I appreciate getting your comments and constructive criticism about Telecomputing Workshop. ■

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RESOURCE CENTER

The Resource Center responds to readers' requests for educational programs.

By MARGARET MORABITO

SO MANY OF YOU have been writing to the Resource Center, I haven't been able to answer all of you personally. So, this month, I'm going to catch up on my mail.

Q *What happened to the disk I sent you a few months ago? I really want the public domain educational programs you offered in the September and November 1986 issues.*

—EVERYONE
HOMETOWN, USA

A This is the question I get most often. The answer is that, since I left my full-time position with *RUN* last February, I haven't been able to keep up with the free education disk distribution project—mainly because I don't have the equipment at home or the finances to support it.

I'd like to continue the project, however, so I've decided to change the conditions. I originally asked you to send a blank disk, on which I'd make a copy and return it for free. Now I must ask that you send, not a disk, but $10 to cover duplication and mailing costs. This way, I can have the disks duplicated in bulk and continue this service.

In Table 1 you'll find a list of the directories for both Volumes 1 and 2, so you can see what programs are on them. To order a disk, see the instructions at the end of this article.

Q *I have Volumes 1 and 2 of the Resource Center Education Disks and enjoy them very much. Will you be coming out with more volumes?*

—ALMOST EVERYONE
HOMETOWN, USA

A Yes. I plan on coming out with four education disks in 1988, one to be released each quarter. I'll let you know when the first one is ready, and at that time I'll list the directory of the disk in this column, so you'll know exactly what it contains before ordering. ►

Table 1. Directories of the Resource Center Education Disks.

Volume 1, Side 1:

Spelling
Menu (Lexikos)
Phoncentration
Brainstorm
Speller
Word Scrambler
Findword
Cell Quiz
Graphic Math
One Col Math
Tictacarith
Math Worksheet

Volume 1, Side 2:

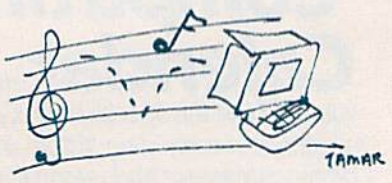
Menu (23 math tutorials written by
Ricky Brewer for his junior high students)

Volume 2, Side 1:

Menu
USA
Spell It
Elem Add/Sub
Alphabet
Guess My Number
Tree Tutor
Robot Math
Division Tutor
Homonyms
Munchmath
Fast Reading
Page Printer
Spanish
Quick Check
48 Add Prob (part of a math series
by William Townsend)
Add Special Ed
Subt 3 Digits
Decimal Adds
Dec Div-1361
Dec Mult Rd
Fract Reduce
Averages
Percent Of
Circle Circumference and Area
Gradebook 128

Volume 2, Side 2:

Menu
Flashquiz 64
Typing Practice
Letter Attack
Keyboard Intro
Keyboard
Bilingual Spell
New States/Caps
New Zealand
Name Records
Mark Records
Analogies
Analogy Practice
Comal80.Can
Microscope Quiz (Comal program)
Periodic Loader (Comal program)



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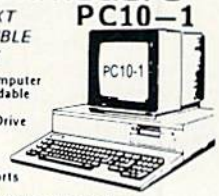


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Q *I'm a 5th grade teacher, and I'm looking for information on free or inexpensive software to use on the C-64s in my classroom.*
—LYNDA KELLER
PAULINA, LA

A In last April's issue, I devoted the entire column to answering this question. Order this back issue, and you will get suggestions for various sources of low-cost educational software, along with a list of names and addresses to contact.

Q *Thank you so much for mentioning KIDware in your recent article concerning low-cost educational software. Now we've moved our offices and would appreciate it if you'd publish our new address.*
—KIDWARE
1380 156TH NE
SUITE H2
BELLEVUE, WA 98007
206-643-7645

A Sure!

Q *Your article in the April issue on educational software was very good. I thought of running a national education user's group in another magazine this year, to help distribute teacher-written educational programs. However, with your distribution of educational material through* RUN, *I decided you and your column were in a much better position to carry out this function than I am as an individual.*

Unfortunately, I've been disappointed, because for months there's been no additional mention in your column of public domain educational material. I wish you would devote at least a paragraph each month to covering the material available and encouraging educators to donate programs that they've written for their classes.
—RICKY BREWER
MIDWAY, TX

A I wish I could include more in the Resource Center on public domain software, but I, too, am just an individual at this point. All the public domain program testing, compiling and distribution I do is on my own, and distributing disks is an expensive and time-consuming proposition.

However, at the urging of hundreds of readers like yourself to continue this service, I'm now renewing my offer for the Resource Center Education Disks, with the difference, as mentioned above, that I must ask for some money to cover my expenses. (By the way, Ricky, thanks again for your donation of the Math Series that I placed on Volume 1 last year!) ■

If you're using Commodore computers for education at home or in school, write to me and share your experiences. Also, please donate public domain educational programs to the Resource Center for sharing with others. Send letters and programs on disk, with a brief description, to:

Margaret Morabito
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HARDWARE GALLERY

If you're in need of extra screen dump capabilities or extra memory, then this column is for you!

Compiled by BETH S. JALA

DOUBLE QUICK BROWN BOX ..... A

You'll Never Lose Your Cool, Or Your Programs, With This Utility

While a computer's brain may be made of silicon, its lifeline is the power cord. Who hasn't experienced a stab of panic followed by a feeling of utter helplessness as you endured the instant evaporation of your electronic efforts? Everything in memory can be lost in an instant if the electrical power is even momentarily interrupted.

Actually, it doesn't always take a power failure for amnesia to strike your computer. Even experienced users occasionally forget to back up newly entered programs before taking them for a test drive. Random Access Memory (RAM) might as well be called Readily Absent Memory when the program crashes and your keyboard locks up.

How many times have you wished you could turn your computer off after a crash and not lose a byte of data? Wouldn't it also be handy to have your favorite telecommunications program or utility already loaded whenever you turn on your computer?

Users of laptop computers already enjoy these conveniences, thanks to a special type of chip known as a CMOS (complementary metal oxide semiconductor) RAM. It consumes a lot less electrical power than a conventional chip, and it can be left on all the time.

CMOS chips are considerably more expensive than the garden variety 8K memory chips that populate the circuit boards of the C-64 and C-128. They also require an internal battery to keep them active when the computer is turned off.

But while manufacturer's costs conspire to deny us non-volatile RAM, devices such as the Double Quick Brown Box are letting Commodore users enjoy some of the advantages previously restricted to owners of battery-powered portables.

Actually, the Double Quick Brown Box probably needs a new name. It's not really a box, but a plug-in cartridge for the C-128 (in 128 mode) as well as the C-64. Made of brown plastic by a man with the first name of Brown, the device has double the capacity of his original CMOS memory enhancement tool for the C-64 (see *RUN*, Hardware Gallery, July 1986).



The Double Quick Brown Box plugged into the C-128's expansion port.

With a capacity of 16K, the DQBB may appear feeble in comparison with the latest 128K and 512K RAM expanders, but this little box is unique. It converts RAM into ROM (Read Only Memory) by switching out 16K of memory beginning at $8000 and replacing it with CMOS RAM. Short of dropping it into the sink or waiting ten years for the internal lithium battery to wear out, the DQBB will never lose its memory, even when disconnected from the computer.

Outwardly, the Double Quick Brown Box is identical to its 8K predecessor. A red push-button generates a system reset for the C-64 that bails you out of a crash while your faulty program remains in memory. The two-position slide switch lets the DQBB switch between 64 and 128 modes. Your C-128 won't come up as a C-64, even though the cartridge port is occupied, when the switch is in the proper position.

The designer's partner has written a series of utilities that let you put as many as eight programs into the DQBB at once. When loaded, each program is listed on a menu and can be called up with a two-character command. Machine language programs for the C-128 that don't employ a Basic loader are the only ones that won't work in this fashion. Otherwise, the DQBB automatically figures out where in memory a ►

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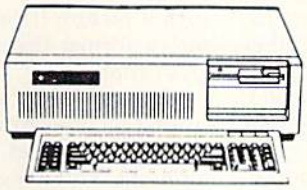
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plugs into the cartridge port, has 4 switchable slots, fuse protected and a reset button.

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12 in. cartridge port extension cable. Move boards and cartridges to the side of your computer. In stock.

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Every once in a while, our buyers find one of those odd gadgets they just can't resist. The Joy Stick Reducer is odd and low-priced. It allows one joystick to be plugged into both ports at the same time. I know you are saying, what's it good for. Stop and think, how many times have you had to try both ports before finding the right one?

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The "Stripper" removes perforated edges from print-outs. Insert 1 to 20 sheets, presto edges are gone. Clean, quick

MODEMS, 1200 Baud

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Avatex 1200	$ 99.95
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One cable for both 40 or 80 columns on the C128. Flip a switch to change modes. Plugs to the back of the monitor for a sharp display. 16 colors in 40 column, black and white in 80. Not for RGB monitors or television sets.

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A reset button that you place where you want, not some out of the way place. Plugs into the serial port (of course the port is replaced for your disk drive), the button is on the end of a 15 inch cable.

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Optical Mouse (Microsoft PC compatible)	$79.95
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The best friend a C128 user ever had . . .Includes C-64, C128, CPM, 1541, 1571. 261 pages of easy to find information. 75 easy to read charts and tables. The Black Book of C128 is very much like a dictionary, always ready to answer your questions.

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A beginners guide to software protection. Written to give you a fundamental understanding of a disk and BASIC protection. Identify what you are seeing when examining a disk. Become a master of illusion. Reveals countless tricks and tips that mystify the user. The book is 141 pages and includes a free disk of 21 utility programs.

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1541 Troubleshooting & Repair Guide	$19.95
Computer facts VIC-20	$19.95
Computer facts C-64	$19.95
Computer facts C-128	$19.95
Computer facts 1541	$19.95
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Write protect tabs, silver, 100 pack	$ 1.49
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Floppy wallet, 5 1/4 in., holds 15	$12.95
Disk pages, 2 pocket, 3 hole, 10 pack	$ 6.95

CALL TOLL FREE 1-800-544-SOFT VSI

program wants to be and sends it to the proper location.

Since a special boot utility activates the software-controlled write-protect tab and lets you reload the box with other programs in less than one minute, you'll probably develop a series of disk files, each containing one or more programs that are used together.

The convenience of switching instantly from one program to another can't be overstated. My DQBB usually contains the two programs that I use while maintaining the Boston Computer Society's Commodore Bulletin Board—a machine language text editor and a compiled disk utility program. I've also saved this particular configuration as a single disk file, which allows me to empty the box for use as a crash-proof Basic workspace and easily restores my utility programs when it's time to work on the BBS.

The documentation provides step-by-step instructions for beginners and fairly thorough guidance for experienced programmers who want to plant some of their own ideas in the box's CMOS memory chips.

With a one-year repair or replacement warranty and a 30-day unconditional refund period, the Double Quick Brown Box is one of the safest computer investments you can make. *(Brown Boxes, Inc., 26 Concord Rd., Bedford, MA 01730; $69 plus $3 shipping.)*

—JOHN PREMACK
LEXINGTON, MA

BLOWUP ..... B

Don't Let the Name Of This Product Deceive You!

Honestly, would you plug anything into your computer that's called Blowup? Surely, it wouldn't *really* terminate the computer! Actually, Blowup is a nifty utility cartridge that just might be of use to you—read on!

Blowup comes as a program cartridge rather than as a disk. That's important to its operation, as you'll soon see. Blowup simply sits in your computer's expansion port and waits for you to push the button on its top. When you do, it grabs control of the machine and lets you do some very special things.

Have you ever wanted to obtain a printed copy of the screen from one of your favorite programs? I'm not talking about just dumping text screens or low-resolution graphics, I'm talking about bit-mapped, high-resolution pictures, including sprites! Perhaps you've thought it would be great to modify such a picture if you could only get it into a format that your drawing program could use.

For a number of years, I've been borrowing pictures from programs to create my own images. It involves a pretty thorough knowledge of machine language programming and the inner workings of your computer. Once you locate the picture in memory, it has to be saved to disk and then modified so that it'll be loaded properly into the drawing program. If you can't find a separate picture file on the disk and the program won't let you break it once it's been started, you'll never be able to get at the picture. With Blowup, you don't have those problems.



You can do a lot of maneuvering with Blowup.

You begin by inserting Blowup in the memory expansion port of your computer. It doesn't work in 128 mode, and that's not made clear in the instruction manual. That's not too much of a restriction, though, since a lot of programs that employ pretty graphics run in 64 mode anyway.

Next, you load whatever program you want to capture a picture from. You do everything just as you would without Blowup inserted. Since the Blowup program has its own memory, it shouldn't interfere with the main program.

Once your program has finished loading, whenever you see a picture on the screen that you want to save, just hit the button and let Blowup take control. A detailed menu appears on the screen that lets you do several things. You can print the picture in either normal or reversed image. You can even rotate the picture—since your screen is horizontal and printer paper is usually vertical, this makes it easy to get the whole picture to print properly. You can crop a section of the picture and save it to disk in normal (bit-map), Koala or Doodle! format.

You can enlarge or reduce the image in either the X or Y plane by using the magnify option; you can choose to include sprites in the printout or file; and you can reverse the picture by using mirror imaging.

Another function lets you specify a delay after every printed line to keep you from overheating the print head. You can even use Blowup to load a previously stored text file. And, Blowup supports a wide variety of printers.

Theoretically, by selecting the warm-start option after you capture the picture, you can return to the main program at the point where you stopped it. The cold-start option resets the computer to Basic.

Sounds like a pretty dandy program, doesn't it? If everyone followed the same programming techniques, it probably would be possible for Blowup to do its job effectively every time. However, programmers seldom do things the same way each time, and that can result in some conflicts.

Some of the problems I encountered include an inability to capture a picture on the screen while disk loading was still in progress. I also found the sound on many programs to be affected when Blowup was activated and not all programs operated correctly, if at all, after interrupting them with Blowup. The instructions include some possible solutions for these problems, but they didn't clear the difficulty in all cases. You can end up with a locked keyboard or other problems.

It appears that Blowup comes about as close to being a universal "screen dump" as technology permits. I was generally pleased with the results and certainly don't mind having a tool that eliminates the need for me to perform computer gymnastics just to play with a high-resolution picture.

I've graded this program slightly below excellent due to the omission of information on using it with the C-128. In addition, I think a short paragraph describing the problems you can encounter with some programs would also be appropriate.

If you like to play with graphics or have a need to capture pictures for use elsewhere, consider Blowup as a good utility cartridge to have. *(Data Share, Inc., 717 South Emporia, Wichita, KS 67211; $59.95.)*

—JIM GRUBBS
SPRINGFIELD, IL ■

Learn To Walk Before You RUN

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

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

2. To help you catch mistakes in typing in listings, we publish two checksum programs each month, called 64 Perfect Typist and 128 Perfect Typist. (Follow the directions in How To Type *RUN* Listings, elsewhere in this issue.)

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

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

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

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

```
CLOSE15 <press return>
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Be sure not to erase the final version!

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

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

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

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

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

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

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

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

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

COMMODORE CLINIC

What happens to a program when it's abandoned by its vendor, and how can you use a laser printer with your Commodore?

By JIM STRASMA

HARDWARE

Q *Are there any 1571-compatible, non-Commodore disk drives on the market yet, and will the 1581 work with both the C-64 and C-128?*

—RONALD PACK
AURORA, CO

A I certainly haven't heard of any 1571-compatible disk drives yet and wouldn't expect to for a while. Even for Commodore, the 1571 provided many design challenges whose solutions will take some time to reverse-engineer.

As for the new 1581 microfloppy disk drive, yes, it works with both the C-64 and the C-128, adding storage space to both.

Q *I've read that Commodore is developing a new ROM chip for the 1571 disk drive. Is this chip available yet, and if so, where can I get one?*

—RAYMOND HYMAN
PHILADELPHIA, PA

A A ROM that upgrades the 1571's performance is indeed now available. I got mine today, thanks to a group purchase by the Fox Valley 64 Users Group. The part number of the new chip is 310654-05. With that information, any authorized Commodore service center should be able to order one for you.

Fox Valley lists it as available from Microtech, 328 W. Hillside, N. Aurora, IL 60542; phone 312-892-3551. The upgraded ROM was also listed in a recent ad from K. Boufal Consulting Services (244 Fitzwater St., Philadelphia, PA 19147), so you won't have to go far to find it.

SOFTWARE

Q *A while back you indicated that you and two other gentlemen had put together a church package for the C-64. I would appreciate your sending me any information available regarding that software.*

—STACY HALL
GRAY COURT, SC

A Unfortunately, sales of The Electric Evangelist didn't match expectations, and the author who was to provide support no longer has a C-64. Therefore, we no longer sell the program.

Those who have The Electric Evangelist are welcome to share it with others for non-commercial use. I have also given our remaining copies to my local user's group (S.O.S.U.G., PO Box 6108, Macomb, IL 61455), which will be happy to provide copies. Contact them directly for details.

Q *I'm looking for a C-64 program that can save to disk pictures I draw with a program that came with an Edumate light pen. I bought the light pen about five years ago, and now the maker is out of business.*

—KOLMAN GLICKSBERG
427 WOODLAWN AVE.
GLENCOE, IL 60022

A The program you want is Peripheral Vision, from Futurehouse, the company that made your light pen. The last address I have for them is PO Box 3470, Chapel Hill, NC 27514; phone 919-967-0861.

I've included your full address in case the program is still available from a source willing to contact you or other readers have copies they'd be willing to pass on.

It's incorrect to assume that a product is abandoned by its authors merely because the vendor is out of business. On the other hand, when a good program truly is unavailable, it seems better to share copies with those who still need it than to allow it to disappear from the earth. Just be ready to pay for your copy if you later find the program available commercially.

And, vendors, when abandoning a product, why not give a noncopy-protected shareware version to the nearest user's group? That will both benefit those who still need the program and possibly bring in added income as those who copy it send donations.

Q *I need a program that will list about 300 phonograph albums by publisher, album title, song title, composer, orchestra and conductor. Do you know of any software that can do this?*

—WADE JORDAN
MACON, GA

A If you treated each song as a separate entry, almost any commercial data manager would meet your needs. However, you'd run out of storage on most Commodore disks long before you'd saved all of your data.

A better solution is to use a relational data manager, such as Precision Software's Superbase (sold by Progressive Peripherals, 464 Kalamath St., Denver, CO 80204). That way you can have an entry for each album in one data file, with a separate entry in a second related file for each song on the album. The information shared by all the songs on an album is entered only once. (Depending on the number of songs per album, you may still need to use some abbreviations to get all your data on a 1541 data disk.)

Q *Can you recommend a laser printer for use with our Plus/4 and 64C computers? What interfaces would be required for small-business use?*

—PAUL HEIL
LANCASTER, PA

A Jim Oldfield reports that his Midnite Press book *How to Get the Most Out of GEOS* was written using a Quadram Quadlaser printer, connected to a C-128 via a Xetec Super Graphix interface in Transparent mode and using WordPro 128/S, from Spinnaker Software.

The Quadlaser comes with four built-in fonts and has a megabyte of RAM into which to load other fonts. The only

obstacle to using this printer with a Commodore computer is that your favorite word processor may be unable to embed long sequences of control characters within a document.

For a Plus/4, you may also want to consider using an MW350 printer interface. It is particularly recommended by the Plus Exchange, and it also works well with the C-64 and C-128.

A far more costly but also more flexible laser printer is Apple's LaserWriter. You can use it with your 64C (but not the Plus/4) via the GEOS geoLaser driver and such GEOS programs as geoWrite and geoPublish. Since IBM has just joined Apple in endorsing the LaserWriter's Postscript page description language, the LaserWriter should be compatible with new products for years to come, making up for its relatively high price.

PROGRAMMING

Q *I'm running out of array memory on my C-128. Is there a way to use idle Basic program memory for arrays?*

—JIM LYNCH
ST. THOMAS, VIRGIN ISLANDS

A Yes, although it isn't very convenient and works best when all the data values in the array to be stored that way are small numbers or single characters, so each element can fit in a single byte of memory.

The basic idea is to directly poke the data into, and peek it back out of, unneeded space in the Basic program bank of memory. You'll need to find a safe starting address within the unused space and then locate each element in the poked array relative to that address. It's also up to you to make sure nothing tampers with that memory, since Basic offers very few safeguards when using the Peek and Poke commands.

Before going to that extreme, I'd remind you of integer arrays. If a numeric array variable name ends with a percent sign (%), each of its elements take up three fewer bytes of memory than usual. The savings in a large array are sufficient to be worth a serious effort to limit data values to integers.

Q *I'm writing a program that accesses 30 relative files. Do I have to use 30 Open and Close statements, or can I make a subroutine using variables?*

—KEN PAOLINO
PITTSBURGH, PA

A Here's a program example for the C-64 that uses variables and a subroutine to open and close three previously existing relative files, one at a time. (The 1541 disk drive allows only one relative file to be open at a time.) The same technique should work for any reasonable number of files.

```
99 REM INITIALIZATION
100 DU = 8: REM DISK UNIT
110 DD$ = "0": REM DATA DRIVE
120 OPEN 15,DU,15 : REM DISK CMD
    CHANNEL
199 REM FIRST CALL
200 RF$ = "FIRSTFILE"
210 GOSUB 1000
220 REM FIRST FILE IS NOW OPEN
299 REM SECOND CALL
300 RF$ = "SECONDFILE"
310 GOSUB 1000
320 REM SECOND FILE IS NOW OPEN
399 REM THIRD CALL
400 RF$ = "THIRDFILE"
410 GOSUB 1000
420 REM THIRD FILE IS NOW OPEN
900 GOTO 9998
996 REM S/R TO CLOSE A CURRENTLY
    OPEN
997 REM FILE, THEN OPEN ANOTHER
    EXISTING
998 REM RELATIVE FILE WHOSE NAME
    IS IN
999 REM VARIABLE RF$ ON DISK UNIT
    DU.
1000 CLOSE 5
1010 OPEN 5,DU,5,DD$ + ":" + RF$
1020 GOSUB 2000
1030 RETURN
1998 REM S/R TO CHECK DISK FOR
    ERRORS
1999 REM USING VARIABLES EN, EM$,
    ET & ES.
2000 INPUT#15,EN,EM$,ET,ES
2010 IF EN>0 THEN PRINT
    EN,EM$,ET,ES: STOP
2020 RETURN
9998 CLOSE 15
9999 END
```

Q *I have a couple of questions about using FRE(X) to find the space used in RAM. First, what's the formula for the C-64? Also, some programs show no space used. Don't machine language programs use up space in RAM?*

—WALLACE EDSON
LOMPOC, CA

A The FRE( ) function on the C-64 finds your remaining Basic work space by subtracting the current contents of a pointer to the start of the Basic program work space from the contents of a pointer to the end of the current Basic program. The difference is the remaining number of free bytes, stored as a two-byte integer.

Since two-byte integer values greater than 32767 are interpreted as negative and there are initially 38911 Basic bytes free on the C-64, if you try ? FRE(0) immediately after switching on your computer, the machine will report –26627 bytes free. When you get a negative number of bytes free, ? 65536 + FRE(0) shows the correct answer.

If you give the latter command immediately after switching on, the response will be 38909, two bytes fewer than claimed by Commodore's sign-on message. The difference is due to two zero bytes that end each Basic program and are present even before a program is written or loaded. Commodore considers them initially free, but FRE(0) counts them as used.

As for machine language programs, they do use space in RAM, but unless they emulate Basic in the way they allocate that space, FRE(0) may not even know they're in memory. Then, too, some machine language programs use ►

portions of memory unavailable to Basic and don't reduce Basic's work space.

OTHER

Q Can you recommend any good sources of information on starting a home business, such as doing word processing or maintaining mail lists?

—DIANE HIEM
HIGHLAND, IL

A The most helpful resource I ever found along those lines was the book *The Incredible Secret Money Machine*, by Don Lancaster. Don was a true pioneer in the microcomputer revolution and has been quite successful over the years in making a living working at home. This book details his methods, several of which I've found useful in my own work.

A more recent resource specifically for Commodore owners with small businesses is *Money Machine*, a bi-monthly magazine from Redwood Empire, PO Box 6609, San Mateo, CA 94403.

UPDATE

In the June Clinic, you gave reader Todo Brye an assembly language version of a small Basic program he sent in. However, the assembly code you published has a problem. The code should read:

Object Code:	*Source Code:*
A0 03	*LDY #3*
B1 2D	*LDA ($2D),Y*
85 14	*STA $14*
C8	*INY*
B1 2D	*LDA ($2D),Y*
85 15	*STA $14+1*
A9 00	*LDA #0*
A8	*TAY*
91 14 LOOP	*STA ($14),Y*
C8	*INY*
D0 FB	*BNE LOOP*
60	*RTS*

—DARREN SPRUYT
GRAVENHURST, ONTARIO, CANADA

A You're absolutely right. Leaving out those first six lines is an example of an error I've had a good bit of trouble with over the years—overlooking a level of indirection in a problem that requires multiple levels of indirection. Thanks so much for the correction. ■

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard to:

Commodore Clinic
c/o RUN Magazine
80 Elm St.
Peterborough NH 03458

Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

The Hot Shot PLUS™

Advanced Graphics Printer Interface

HERE IT IS!

The Hot Shot PLUS is the most advanced and useful printer interface ever created for the Commodore computer. The Hot Shot PLUS has the standard features you have come to expect in a printer interface, including Full Commodore Emulation and Transparent operating modes, giving you the maximum capability and performance possible from your printer! However, that is just the beginning! The Hot Shot PLUS comes with a **built-in 8K buffer,** which you can **expand to a 16K, 32K, 48K, or 64K buffer** just by adding additional chips! A built-in Reset button allows you to clear the buffer. The Hot Shot PLUS has been designed to take complete advantage of your printers special graphics features! The Hot Shot PLUS has **6 Near Letter Quality Fonts** built into its ROM, giving most popular printers greatly increased printing quality and versatility. Users can design and **upload** from **2 to 42 additional customized fonts** into the Hot Shot PLUS memory. The Hot Shot PLUS comes complete with its **Fantastic Font Editor built into its ROM.** You load it into your computer just as if the Hot Shot PLUS were a disk drive! The Fantastic Font Editor is **compatible with the C64, C128 in 128 mode, and the Plus4!** A disk is included with many additional fonts, and fonts from the Xetec Super Graphics Sr™ can be converted to the Hot Shot PLUS format. The Hot Shot PLUS has been designed to eliminate print head Shuffling and maximize graphics printing speed. The Hot Shot PLUS has a unique **Graphics Enhancement Mode** which allows you to print standard graphics printouts in **Double or Quadruple Density!** Graphics quality with programs such as The Printshop™, Sideways™, and Geos™ fonts are dramatically improved using this feature, which is compatible with most popular printers. No other interface has this great feature! The Hot Shot PLUS also has **two sets of DIP switches,** allowing you to directly select and change all the above settings. CP/M Mode selection also. All this and more at a list price of only **$99.95.**



HOT SHOT PLUS vs SUPER GRAPHIX SR.	Super Graphics Sr.	Hot Shot PLUS
NUMBER OF BUILT IN FONTS	1	6
POSSIBLE FONTS IN MEMORY	3	42
STANDARD BUFFER PROVIDED	8K	8K
BUFFER USER EXPANDABLE	NO	YES
MAXIMUM BUFFER EXPANSION	n/a	64K
BUILT IN ITALIC & BOLD FONTS	NO	YES
BUILT IN FONT EDITOR	NO	YES
FONT EDITOR PLUS4 COMPATIBLE	NO	YES
GRAPHICS ENHANCEMENT SELECTION	NO	YES
GEOS™ FONT ENHANCEMENT SELECTION	NO	YES
CPM SELECTION	NO	YES

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SO: We think the features above show the Hot Shot PLUS is a far better choice than the Xetec Super Graphics Sr at the same list price. Don't buy a printer interface until you get more information on these products! Call us today to ask us why you should choose our interfaces. This ad does not let us fully describe the features of these products. These are the best printer interfaces on the market, and we know you will like them better than any other. We also have a trade-in offer and other incentives! Call us and let us send you full information. Or mark the reader service card if you're not in a hurry. But don't choose less satisfaction. Instead, **call us today!**

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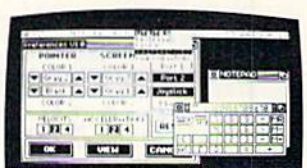
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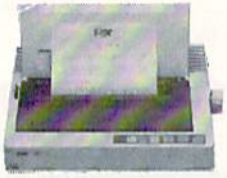


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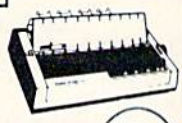


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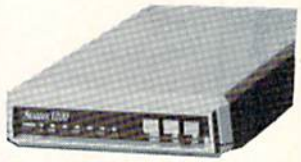
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From p. 56.

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,169,154,32,210,148:REM*149
265 DATA 32,231,146,96,169,1,14
    1,226,2,32,188,151,32,29,14
    5,200,177,253,201    :REM*78
270 DATA 32,208,4,200,76,71,137
    ,72,174,188,2,169,44,157,60
    ,3,232,104,157       :REM*209
275 DATA 60,3,232,169,44,157,60
    ,3,232,169,82,157,60,3,142,
    223,2,142,188        :REM*104
280 DATA 2,96,32,204,255,32,2,1
    39,32,45,135,32,176,144,32,
    204,255,173,53       :REM*177
285 DATA 3,208,1,96,32,2,145,10
    4,104,76,199,137,230,158,24
    0,1,96,230,159       :REM*252
290 DATA 96,172,223,2,169,87,15
    3,60,3,200,140,188,2,96,32,
    244,146,32,32        :REM*129
295 DATA 137,169,0,141,241,2,14
    1,242,2,141,243,2,141,244,2
    ,141,246,2,141       :REM*182
300 DATA 245,2,169,1,133,158,16
    9,8,133,159,96,76,137,150,3
    2,231,255,32,164     :REM*159
305 DATA 137,32,13,145,144,3,76
    ,137,150,169,0,157,0,160,14
    2,243,2,32,59        :REM*242
310 DATA 137,173,239,2,201,116,
    144,3,76,202,137,173,233,2,
    141,180,2,32,114     :REM*57
315 DATA 137,162,1,32,198,255,1
    60,0,32,207,255,145,158,32,
    183,255,208,6,32     :REM*142
320 DATA 143,137,76,253,137,32,
    143,137,165,158,133,181,165
    ,159,133,182,32,204  :REM*19
325 DATA 255,32,123,137,32,2,14
    5,32,190,137,174,243,2,32,1
    51,137,173,234,2,141
                         :REM*108
330 DATA 180,2,32,114,137,162,1
    ,32,201,255,160,0,177,158,3
    2,210,255,32,143     :REM*99
335 DATA 137,165,158,197,181,20
    8,242,165,159,197,182,208,2
    36,32,204,255,32,123:REM*78
340 DATA 137,32,2,145,76,202,13
    7,169,184,133,253,133,171,1
    69,5,133,254,169,217
                         :REM*119
345 DATA 133,172,169,40,32,202,
    147,162,12,160,5,177,253,72
    ,177,171,72,169,40,32
                         :REM*228
350 DATA 170,147,104,145,171,10
    4,145,253,169,40,32,202,147
    ,200,192,40,208,229:REM*241
355 DATA 169,40,32,202,147,202,
    208,219,169,15,141,134,2,16
    2,23,160,0,24,32,240
                         :REM*162
360 DATA 255,160,6,169,32,32,21
    0,255,200,192,39,208,246,16
    9,6,141,134,2,96     :REM*23
365 DATA 169,152,133,253,133,17
    1,169,7,133,254,169,219,133
    ,172,169,40,32,170   :REM*20
370 DATA 147,162,12,160,5,177,2
    53,72,177,171,72,169,40,32,
    202,147,104,145,171:REM*153
375 DATA 104,145,253,169,40,32,
    170,147,200,192,40,208,229,
    169,40,32,170,147,202
                         :REM*210
380 DATA 208,219,162,11,160,6,2
    4,32,240,255,160,6,169,32,3
    2,210,255,200,192,38
                         :REM*233
385 DATA 208,246,96,169,0,32,18
    9,255,169,15,174,180,2,168,
    32,186,255,32,192    :REM*190
390 DATA 255,96,169,1,32,195,25
    5,169,15,32,195,255,96,32,1
    20,145,144,3,76      :REM*55
395 DATA 137,150,32,106,150,32,
    110,145,32,244,146,169,0,32
    ,210,148,174,221,2   :REM*104
400 DATA 189,28,155,32,210,255,
    169,4,32,210,148,32,78,149,
    173,177,2,201,32     :REM*243
405 DATA 240,8,32,36,147,144,24
    1,76,137,150,169,8,32,210,1
    48,32,115,145,169    :REM*112
410 DATA 12,32,210,148,169,3,14
    1,225,2,141,228,2,169,22,14
    1,227,2,162,10       :REM*123
415 DATA 160,17,32,176,139,144,
    3,76,137,150,169,1,141,230,
    2,32,244,146,169     :REM*56
420 DATA 158,32,210,148,32,67,1
    41,206,230,2,173,186,2,201,
    1,208,3,76,137       :REM*17
425 DATA 150,169,78,141,60,3,16
    9,48,141,61,3,169,58,141,62
    ,3,32,208,146        :REM*66
430 DATA 32,25,139,76,137,150,2
    4,32,240,255,169,0,133,198,
    141,224,2,32,78      :REM*125
435 DATA 149,32,36,147,144,2,56
    ,96,32,228,255,240,241,72,3
    2,234,147,169,0      :REM*190
440 DATA 133,198,104,201,34,208
    ,11,72,165,212,73,128,133,2
    12,104,76,23,140,201
                         :REM*117
445 DATA 17,240,15,201,29,240,1
    1,201,145,240,7,201,157,240
    ,3,76,2,140,141      :REM*224
450 DATA 181,2,165,212,240,191,
    173,181,2,76,23,140,201,13,
    240,97,201,136,240   :REM*237
455 DATA 93,201,20,240,33,201,1
    48,240,29,174,224,2,208,164
    ,32,210,255,174,225  :REM*62
460 DATA 2,157,60,3,232,142,225
    ,2,236,227,2,144,146,238,22
    4,2,76,187,139       :REM*205
465 DATA 169,0,133,198,173,225,
    2,205,228,2,208,3,76,187,13
    9,56,32,240,255      :REM*0
470 DATA 136,24,32,240,255,169,
    32,32,210,255,56,32,240,255
    ,136,24,32,240,255 :REM*193
475 DATA 174,225,2,202,142,225,
    2,169,0,157,60,3,141,224,2,
    76,187,139,174       :REM*68
480 DATA 232,2,208,8,174,225,2,
    142,188,2,24,96,174,225,2,2
    01,13,208,3          :REM*1
485 DATA 76,128,140,169,0,157,6
    0,3,76,111,140,32,120,145,1
    44,3,76,137,150      :REM*80
490 DATA 32,106,150,32,98,150,3
    2,110,145,169,16,32,210,148
    ,169,20,32,210,148   :REM*85
495 DATA 162,0,142,203,2,142,20
    2,2,169,1,141,195,2,169,80,
    141,198,2,169        :REM*16
500 DATA 197,133,253,169,5,133,
    254,169,13,141,204,2,162,1,
    32,244,147,32,36     :REM*217
505 DATA 147,144,3,76,137,150,1
    73,186,2,201,1,208,13,169,7
    7,141,63,3,169       :REM*118
510 DATA 48,141,64,3,76,235,140
    ,169,77,141,63,3,169,49,141
    ,64,3,162,0          :REM*9
515 DATA 189,18,155,157,60,3,23
    2,224,3,208,245,169,5,141,1
    88,2,32,208,146      :REM*9
520 DATA 32,176,144,32,204,255,
    32,25,139,76,137,150,162,0,
    142,220,2,232,142    :REM*72
525 DATA 226,2,142,218,2,32,2,1
    39,32,81,152,32,176,144,32,
    204,255,32,25        :REM*43
530 DATA 139,173,53,3,240,3,76,
    132,141,173,207,2,141,219,2
    ,32,202,153,32       :REM*200
535 DATA 12,147,32,12,147,169,2
    4,32,210,148,169,3,141,204,
    2,141,199,2,169      :REM*71
540 DATA 52,133,253,169,5,133,2
    54,162,0,142,198,2,232,142,
    203,2,142,202,2      :REM*186
545 DATA 32,244,147,173,230,2,2
    40,1,96,173,186,2,201,1,208
    ,3,76,132,141        :REM*143
550 DATA 169,6,141,194,2,162,0,
    142,192,2,174,192,2,32,15,1
    45,144,11,169        :REM*12
555 DATA 0,141,218,2,141,226,2,
    76,137,150,142,192,2,238,19
    2,2,169,0,133        :REM*177
560 DATA 253,169,168,133,254,22
    4,0,240,8,169,34,32,202,147
    ,202,208,248,162,3 :REM*194
565 DATA 160,0,177,253,240,8,15
    7,60,3,200,232,76,173,141,1
    42,188,2,169,82      :REM*205
570 DATA 141,60,3,169,48,141,61
    ,3,169,58,141,62,3,32,208,1
    46,32,176,144        :REM*160
575 DATA 32,204,255,32,25,139,7
    6,124,141,169,0,133,253,169
    ,168,133,254,32,12 :REM*101
580 DATA 147,169,30,32,210,148,
    32,115,145,169,21,141,193,2
    ,162,7,160,19,32     :REM*126
585 DATA 236,148,169,0,141,225,
    2,141,228,2,169,16,141,227,
    2,162,7,160,19       :REM*143
590 DATA 32,176,139,32,110,145,
    174,211,2,240,8,169,34,32,2
    02,147,202,208,248 :REM*220
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    ,200,204,188,2,208,245,169,
    61,145,253,200,140 :REM*185
600 DATA 192,2,165,253,72,165,2
    54,72,174,211,2,32,188,151,
    32,29,145,104,133   :REM*20
605 DATA 254,104,133,253,162,0,
    172,192,2,189,60,3,145,253,
    200,232,236,188,2   :REM*95
610 DATA 208,244,169,0,145,253,
    32,98,150,24,96,162,1,142,2
    18,2,142,231,2      :REM*72
615 DATA 169,0,141,220,2,32,2,1
    39,32,81,152,32,176,144,32,
    204,255,32,25       :REM*81
620 DATA 139,173,53,3,240,3,76,
    168,142,173,207,2,141,219,2
    ,32,202,153,32      :REM*224
625 DATA 12,147,169,1,141,230,2
    ,169,34,32,210,148,32,67,14
    1,206,230,2,173     :REM*107
630 DATA 186,2,201,1,208,11,169
    ,0,141,218,2,141,231,2,76,1
    37,150,162,0        :REM*60
635 DATA 142,192,2,174,192,2,32
    ,15,145,144,3,76,168,142,14
    2,192,2,238,192     :REM*193
640 DATA 2,32,188,151,169,3,141
    ,229,2,32,34,145,169,83,141
    ,60,3,169,48        :REM*64
645 DATA 141,61,3,169,58,141,62
    ,3,32,208,146,32,176,144,32
    ,204,255,32,25      :REM*223
650 DATA 139,76,184,142,32,244,
    146,32,98,150,32,106,150,32
    ,110,145,169,38,32 :REM*124
655 DATA 210,148,169,42,32,210,
    148,169,46,32,210,148,169,2
    1,141,204,2,169,80 :REM*199
660 DATA 141,198,2,169,0,141,20
    3,2,141,202,2,169,193,133,2
    53,169,5,133,254    :REM*148
665 DATA 162,2,142,195,2,32,244
    ,147,32,36,147,144,3,76,137
    ,150,173,186,2      :REM*129
670 DATA 201,1,208,3,76,60,144,
    201,3,208,3,76,42,144,32,11
    0,145,169,50        :REM*212
675 DATA 32,210,148,169,4,141,2
    04,2,141,199,2,169,7,141,20
    2,2,162,0,142       :REM*49
680 DATA 195,2,142,198,2,232,14
    1,203,2,169,213,133,253,169
    ,6,133,254,162,0    :REM*192
685 DATA 32,244,147,32,36,147,1
    44,3,76,137,150,32,12,147,1
    69,54,32,210,148    :REM*211
690 DATA 169,1,141,232,2,206,18
    6,2,169,0,141,192,2,174,186
    ,2,240,12,24        :REM*122
695 DATA 173,192,2,105,31,141,1
    92,2,202,208,244,162,7,160,
    4,24,32,240,255     :REM*73
700 DATA 32,115,145,32,123,150,
    174,192,2,189,0,161,240,11,
    201,13,240,7,32     :REM*96
705 DATA 210,255,232,76,181,143
    ,32,130,150,32,78,149,173,1
    77,2,240,248,32,36  :REM*51
710 DATA 147,144,17,32,12,147,3
    2,110,145,32,98,150,169,0,1
    41,232,2,76,72      :REM*180
715 DATA 143,32,234,147,32,110,
    145,160,0,140,228,2,140,225
    ,2,169,54,32,210    :REM*255
720 DATA 148,169,30,141,227,2,1
    62,7,160,4,173,192,2,72,32,
    176,139,144,4       :REM*6
725 DATA 104,76,213,143,104,170
    ,160,0,185,60,3,240,12,201,
    13,240,8,157,0      :REM*223
730 DATA 161,232,200,76,19,144,
    157,0,161,76,213,143,120,16
    9,71,141,20,3,169   :REM*172
735 DATA 144,141,21,3,88,238,23
    5,2,76,137,150,32,138,255,1
    69,0,141,235,2      :REM*9
740 DATA 76,137,150,173,238,2,2
    08,97,173,235,2,208,3,76,17
    3,144,165,212,208   :REM*192
745 DATA 85,173,141,2,141,184,2
    ,165,203,201,3,144,73,201,7
    ,176,69,141,185     :REM*101
750 DATA 2,32,234,147,173,185,2
    ,56,233,3,141,185,2,173,184
    ,2,201,1,208        :REM*182
755 DATA 9,24,173,185,2,105,4,1
    41,185,2,174,185,2,189,30,1
    55,170,32,123       :REM*89
760 DATA 150,189,0,161,240,20,2
    01,13,240,7,32,210,255,232,
    76,145,144,169,13   :REM*134
765 DATA 141,119,2,169,1,133,19
    8,32,130,150,76,49,234,32,2
    04,255,162,15,32    :REM*183
770 DATA 198,255,32,207,255,201
    ,50,144,51,141,53,3,169,0,1
    33,199,32,244,146   :REM*87
775 DATA 169,2,141,134,2,24,162
    ,7,160,7,32,240,255,173,53,
    3,32,210,255        :REM*118
780 DATA 32,207,255,201,13,240,
    6,32,210,255,76,220,144,169
    ,1,141,53,3,32      :REM*211
785 DATA 231,146,96,32,207,255,
    201,13,240,3,76,242,144,169
    ,0,141,53,3,96      :REM*106
790 DATA 169,1,32,195,255,169,1
    5,32,195,255,96,162,0,189,0
    ,160,208,7,232      :REM*79
795 DATA 224,255,208,246,56,96,
    24,96,169,0,141,229,2,160,2
    55,200,177,253,201  :REM*48
800 DATA 34,208,249,200,174,229
    ,2,177,253,201,34,240,8,157
    ,60,3,200,232,76    :REM*11
805 DATA 47,145,142,188,2,152,7
    2,165,253,72,165,254,72,169
    ,3,32,170,147,160   :REM*36
810 DATA 0,177,253,141,239,2,20
    0,177,253,141,240,2,104,133
    ,254,104,133,253,104:REM*49
815 DATA 168,96,162,0,169,0,157
    ,0,160,232,208,250,96,169,0
    ,133,199,96,169     :REM*240
820 DATA 1,133,199,96,173,201,2
    ,208,7,169,8,141,180,2,24,9
    6,32,244,146        :REM*139
825 DATA 32,106,150,32,110,145,
    169,78,32,210,148,169,52,13
    3,253,169,5,133,254 :REM*76
830 DATA 169,1,141,203,2,169,1,
    141,202,2,169,3,141,204,2,1
    41,199,2,162        :REM*23
835 DATA 1,32,244,147,32,36,147
    ,144,2,56,96,173,186,2,201,
    1,208,13,169        :REM*8
840 DATA 0,141,221,2,173,200,2,
    141,180,2,24,96,169,1,141,2
    21,2,173,201        :REM*183
845 DATA 2,141,180,2,24,96,169,
    29,133,253,169,176,133,254,
    96,160,0,185,25     :REM*200
850 DATA 155,145,167,169,2,145,
    169,200,192,3,208,242,96,16
    0,0,169,32,145,167  :REM*97
855 DATA 200,192,3,208,249,96,1
    69,184,133,167,133,169,169,
    5,133,168,169,217,133
                        :REM*52
860 DATA 170,96,24,165,167,105,
    40,133,167,165,168,105,0,13
    3,168,24,165,169,105:REM*41
865 DATA 40,133,169,165,170,105
    ,0,133,170,96,56,165,167,23
    3,40,133,167,165,168
                        :REM*144
870 DATA 233,0,133,168,56,165,1
    69,233,40,133,169,165,170,2
    33,0,133,170,96,201:REM*239
875 DATA 10,144,26,201,100,144,
    11,169,7,141,209,2,169,25,1
    41,210,2,96,169     :REM*242
880 DATA 8,141,209,2,169,26,141
    ,210,2,96,169,9,141,209,2,1
    69,27,141,210       :REM*229
885 DATA 2,96,174,222,2,134,253
    ,172,223,2,132,254,169,30,3
    2,170,147,160,0     :REM*156
890 DATA 177,253,141,205,2,200,
    177,253,141,206,2,169,3,32,
    170,147,56,165,253  :REM*53
895 DATA 233,29,141,207,2,165,2
    54,233,176,141,208,2,162,5,
    78,208,2,110,207    :REM*160
900 DATA 2,202,208,247,96,169,0
    ,174,180,2,172,217,2,32,186
    ,255,169,60,170     :REM*97
905 DATA 169,3,168,173,188,2,32
    ,189,255,169,0,166,155,164,
    156,32,213,255,142  :REM*62
910 DATA 222,2,140,223,2,96,173
    ,188,2,162,60,160,3,32,189,
    255,169,15,174      :REM*225
915 DATA 180,2,168,32,186,255,3
    2,192,255,96,32,159,255,165
    ,203,201,60,208,247 :REM*64
920 DATA 32,234,147,96,32,110,1
    45,162,0,169,32,157,144,5,1
    57,128,6,232,208    :REM*169
925 DATA 247,157,112,7,232,224,
    80,208,248,32,110,145,162,7
    ,160,0,24,32,240    :REM*220
930 DATA 255,160,0,169,32,32,21
    0,255,200,192,39,208,246,96
    ,173,177,2,201,255 :REM*119
935 DATA 208,2,56,96,24,96,169, ►
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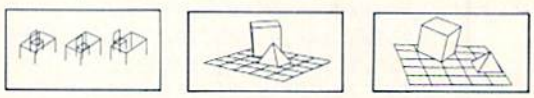
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    209,133,253,169,5,133,254,1
    69,2,141,202,2        :REM*56
940 DATA 169,1,141,203,2,169,3,
    141,199,2,141,204,2,173,200
    ,2,141,181,2          :REM*101
945 DATA 173,201,2,141,182,2,16
    2,1,32,244,147,32,36,147,14
    4,3,76,157,147        :REM*116
950 DATA 24,169,7,109,186,2,141
    ,200,2,141,180,2,173,177,2,
    201,7,208,1           :REM*227
955 DATA 96,169,33,133,253,169,
    6,133,254,162,1,32,244,147,
    32,36,147,144,3       :REM*36
960 DATA 76,157,147,173,177,2,2
    01,7,208,1,96,24,169,7,109,
    186,2,141,201         :REM*93
965 DATA 2,96,173,181,2,141,200
    ,2,173,182,2,141,201,2,96,1
    41,171,2,56           :REM*170
970 DATA 165,253,237,171,2,133,
    253,165,254,233,0,133,254,5
    6,165,171,237,171,2:REM*173
975 DATA 133,171,165,172,233,0,
    133,172,96,141,171,2,24,165
    ,253,109,171,2,133    :REM*62
980 DATA 253,165,254,105,0,133,
    254,24,165,171,109,171,2,13
    3,171,165,172,105,0:REM*231
985 DATA 133,172,96,32,159,255,
    165,203,201,64,208,247,96,1
    42,195,2,32,186,148:REM*156
990 DATA 169,0,141,196,2,141,19
    7,2,169,1,141,186,2,32,78,1
    49,173,177,2          :REM*7
995 DATA 240,248,201,32,240,35,
    201,2,240,66,201,1,208,3,76
    ,58,148,201,4         :REM*92
1000 DATA 208,3,76,131,148,201,
    3,208,3,76,160,148,201,255
    ,208,1,96,201,7     :REM*103
1005 DATA 208,210,96,173,186,2,
    96,173,203,2,208,200,173,1
    96,2,240,195,32,186
                        :REM*188
1010 DATA 148,173,198,2,32,170,
    147,206,186,2,206,186,2,20
    6,196,2,76,120,148:REM*207
1015 DATA 173,203,2,208,169,173
    ,196,2,205,195,2,240,26,32
    ,186,148,173,198,2 :REM*54
1020 DATA 32,202,147,238,196,2,
    238,186,2,238,186,2,32,186
    ,148,160,75,32,201:REM*229
1025 DATA 148,76,7,148,173,197,
    2,205,202,2,208,3,76,7,148
    ,238,197,2,32         :REM*39
1030 DATA 186,148,173,199,2,32,
    202,147,238,186,2,76,120,1
    48,173,197,2,208,3:REM*208
1035 DATA 76,7,148,206,197,2,32
    ,186,148,173,199,2,32,170,
    147,206,186,2,76      :REM*5
1040 DATA 120,148,160,0,177,253
    ,73,128,145,253,200,204,20
    4,2,208,244,96,162,0
                        :REM*190
1045 DATA 202,208,253,136,208,2
    48,96,170,189,250,158,141,
    193,2,232,189,250,158
                        :REM*93
1050 DATA 141,194,2,232,189,250
    ,158,72,232,189,250,158,16
    8,104,170,140,179,2:REM*46
1055 DATA 142,178,2,173,194,2,1
    41,134,2,169,38,133,247,16
    9,155,133,248,160,0
                        :REM*189
1060 DATA 177,247,205,193,2,240
    ,6,32,64,149,76,2,149,24,1
    74,178,2,172,179,2,32
                        :REM*128
1065 DATA 240,255,160,1,177,247
    ,240,32,201,255,240,7,32,2
    10,255,200,76,27,149
                        :REM*83
1070 DATA 200,152,72,238,178,2,
    174,178,2,172,179,2,24,32,
    240,255,104,168,76:REM*108
1075 DATA 27,149,96,24,165,247,
    105,1,133,247,165,248,105,
    0,133,248,96,32,159
                        :REM*103
1080 DATA 255,173,141,2,141,187
    ,2,32,159,255,165,203,201,
    60,208,9,32,234,147
                        :REM*116
1085 DATA 169,32,141,177,2,96,2
    01,63,208,9,169,255,141,17
    7,2,32,234,147,96   :REM*95
1090 DATA 201,3,208,9,169,7,141
    ,177,2,32,234,147,96,201,6
    ,208,9,169,5          :REM*220
1095 DATA 141,177,2,32,234,147,
    96,201,7,240,21,201,2,208,
    34,173,187,2,240      :REM*47
1100 DATA 6,169,3,141,177,2,96,
    169,4,141,177,2,96,173,187
    ,2,240,6,169          :REM*252
1105 DATA 1,141,177,2,96,169,2,
    141,177,2,96,169,0,141,177
    ,2,96,169,147         :REM*117
1110 DATA 32,210,255,162,0,169,
    6,157,0,216,157,0,217,157,
    0,218,157,0,219       :REM*22
1115 DATA 232,208,241,169,6,141
    ,194,2,169,15,141,33,208,1
    69,14,141,32,208,162
                        :REM*73
1120 DATA 0,169,160,157,0,4,169
    ,11,157,0,216,232,224,40,2
    08,241,162,0,169      :REM*140
1125 DATA 121,157,64,5,169,160,
    157,104,5,169,11,157,104,2
    17,157,64,217,232,224
                        :REM*89
1130 DATA 40,208,233,162,0,169,
    160,157,40,4,169,6,157,40,
    216,232,224,200,208
                        :REM*100
1135 DATA 241,169,120,157,40,4,
    169,6,157,40,216,232,224,2
    40,208,241,32,115,145
                        :REM*143
1140 DATA 169,110,32,210,148,16
    2,0,169,160,157,192,7,169,
    14,157,192,219,232,224
                        :REM*28
1145 DATA 40,208,241,169,114,32
    ,210,148,169,118,32,210,14
    8,169,122,32,210,148:REM*9
1150 DATA 169,126,32,210,148,32
    ,110,145,96,32,110,145,169
    ,130,32,210,148,32,115
                        :REM*220
1155 DATA 145,169,134,32,210,14
    8,96,32,110,145,169,138,76
    ,210,148,165,1,41,254
                        :REM*163
1160 DATA 133,1,96,165,1,9,1,13
    3,1,96,32,123,150,173,12,1
    55,201,1,240,3      :REM*152
1165 DATA 108,14,155,32,192,149
    ,32,99,145,169,0,141,226,2
    ,141,218,2,141,232 :REM*31
1170 DATA 2,169,1,141,238,2,169
    ,42,133,253,169,4,133,254,
    170,169,40,141,198 :REM*38
1175 DATA 2,169,22,141,199,2,16
    9,1,141,202,2,169,15,141,2
    04,2,169,0,141        :REM*21
1180 DATA 203,2,32,244,147,173,
    177,2,201,255,208,3,76,71,
    151,173,186,2,201 :REM*194
1185 DATA 1,208,3,76,9,152,201,
    10,208,32,32,2,139,32,81,1
    52,32,176,144         :REM*163
1190 DATA 32,204,255,32,25,139,
    173,53,3,240,3,76,137,150,
    32,12,147,32,205      :REM*48
1195 DATA 153,76,137,150,201,3,
    208,3,76,132,151,201,7,208
    ,3,76,26,152,201  :REM*253
1200 DATA 5,208,3,76,31,139,201
    ,9,208,3,76,134,140,201,6,
    208,3,76,12           :REM*200
1205 DATA 141,201,4,208,3,76,97
    ,142,201,8,208,3,76,242,14
    2,201,2,208,3         :REM*11
1210 DATA 76,69,135,76,137,150,
    32,234,147,169,0,133,198,1
    41,238,2,169,71,141
                        :REM*128
1215 DATA 24,3,169,147,32,210,2
    55,169,6,141,33,208,32,130
    ,150,169,14,141,32:REM*195
1220 DATA 208,141,134,2,173,218
    ,2,208,3,108,2,160,32,89,1
    66,32,51,165,169    :REM*186
1225 DATA 0,141,218,2,32,144,25
    5,32,142,166,76,174,167,32
    ,2,139,32,81,152      :REM*77
1230 DATA 32,176,144,32,204,255
    ,173,53,3,240,6,32,20,139,
    76,137,150,32,20    :REM*254
1235 DATA 139,162,1,142,218,2,1
    62,1,142,219,2,202,142,220
    ,2,32,202,153,176   :REM*49
1240 DATA 3,76,137,150,32,13,14
    5,144,3,76,137,150,169,35,
    133,253,169,176,133
                        :REM*162
1245 DATA 254,224,0,240,8,169,3
    2,32,202,147,202,208,248,1
    73,226,2,240,1,96   :REM*13
1250 DATA 173,231,2,240,1,96,32
    ,2,139,32,29,145,169,255,1 ►
```

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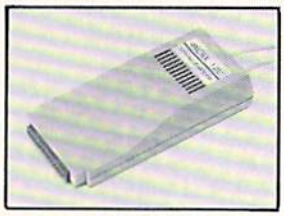
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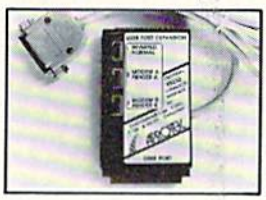
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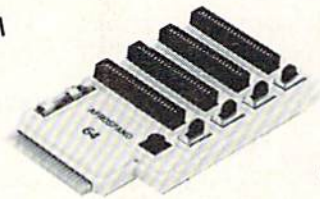
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```
      41,217,2,32,169    :REM*242
1255 DATA 146,32,176,144,32,2Ø4
      ,255,173,53,3,24Ø,6,32,2Ø,
      139,76,137,15Ø,32  :REM*45
126Ø DATA 2Ø,139,165,175,133,46
      ,165,174,133,45,76,71,151,
      32,98,15Ø,32,115,15Ø
                         :REM*17Ø
1265 DATA 32,47,147,169,Ø,141,2
      Ø3,2,76,137,15Ø,32,12Ø,145
      ,144,3,76,137,15Ø  :REM*189
127Ø DATA 32,244,146,169,142,32
      ,21Ø,148,174,221,2,189,28,
      155,32,21Ø,255,169,2
                         :REM*54
1275 DATA 141,188,2,169,86,141,
      6Ø,3,169,48,141,61,3,32,2Ø
      8,146,32,176,144   :REM*65
128Ø DATA 32,2Ø4,255,32,25,139,
      76,137,15Ø,32,12Ø,145,144,
      8,32,25,139,1Ø4,1Ø4 :REM*5
1285 DATA 76,137,15Ø,169,239,14
      1,4Ø,3,162,Ø,189,16,155,15
      7,6Ø,3,232,189,16  :REM*194
129Ø DATA 155,157,6Ø,3,169,2,14
      1,188,2,169,Ø,133,155,141,
      217,2,169,176,133  :REM*83
1295 DATA 156,32,169,146,169,23
      7,141,4Ø,3,32,1Ø9,146,169,
      Ø,141,215,2,141,211
                         :REM*148
13ØØ DATA 2,141,212,2,173,2Ø7,2
      ,2Ø8,8,169,Ø,141,216,2,76,
      18Ø,152,2Ø1,14     :REM*191
13Ø5 DATA 176,6,141,216,2,76,18
      Ø,152,169,13,141,216,2,169
      ,6,133,253,169,176:REM*12Ø
131Ø DATA 133,254,24,162,9,16Ø,
      1Ø,32,24Ø,255,169,11,141,1
      34,2,23Ø,199,16Ø,Ø :REM*79
1315 DATA 177,253,32,21Ø,255,2Ø
      Ø,192,16,2Ø8,246,24,162,9,
      16Ø,7,32,24Ø,255,174
                         :REM*17Ø
132Ø DATA 221,2,189,28,155,32,2
      1Ø,255,32,13Ø,15Ø,16Ø,28,1
      62,9,24,32,24Ø,255 :REM*61
1325 DATA 173,2Ø6,2,174,2Ø5,2,3
      2,2Ø5,189,32,123,15Ø,173,2
      16,2,2Ø8,8,162,Ø   :REM*2Ø2
133Ø DATA 2Ø2,2Ø8,253,76,137,15
      Ø,23Ø,199,169,29,133,253,1
      69,176,133,254,169,11
                         :REM*171
1335 DATA 141,181,2,169,6,141,1
      82,2,169,Ø,141,183,2,169,1
      46,32,21Ø,148,32,11Ø
                         :REM*16Ø
134Ø DATA 145,169,6,141,134,2,3
      2,76,153,238,183,2,173,183
      ,2,2Ø5,216,2,2Ø8   :REM*233
1345 DATA 1,96,169,32,32,2Ø2,14
      7,238,181,2,76,5Ø,153,32,1
      1Ø,145,169,6,141   :REM*56
135Ø DATA 134,2,24,174,181,2,17
      2,182,2,32,24Ø,255,16Ø,3,1
      77,253,72,17Ø,2ØØ :REM*211
1355 DATA 177,253,72,32,13Ø,15Ø
      ,1Ø4,32,2Ø5,189,169,13,32,
      21Ø,255,32,123,15Ø,1Ø4
                         :REM*166
136Ø DATA 32,68,146,32,11Ø,145,
      32,251,154,144,3,32,115,14
      5,24,16Ø,13,174,181:REM*47
1365 DATA 2,32,24Ø,255,172,2Ø9,
      2,162,Ø,177,253,2Ø1,34,24Ø
      ,9,32,21Ø,255,232  :REM*16
137Ø DATA 2ØØ,192,25,2Ø8,241,22
      4,16,24Ø,9,169,32,32,21Ø,2
      55,232,76,163,153,32
                         :REM*163
1375 DATA 11Ø,145,24,16Ø,32,174
      ,181,2,32,24Ø,255,172,21Ø,
      2,177,253,32,21Ø,255
                         :REM*11Ø
138Ø DATA 2ØØ,192,3Ø,2Ø8,246,96
      ,32,98,15Ø,32,1Ø6,15Ø,32,2
      55,145,32,226,145,169
                         :REM*2Ø9
1385 DATA 6,141,134,2,32,78,149
      ,173,177,2,2Ø1,1,2Ø8,3,76,
      65,154,2Ø1,2       :REM*58
139Ø DATA 2Ø8,3,76,121,154,2Ø1,
      255,2Ø8,2,24,96,2Ø1,7,2Ø8,
      2,56,96,2Ø1,32     :REM*123
1395 DATA 2Ø8,4Ø,173,218,2,24Ø,
      35,173,219,2,2Ø5,22Ø,2,24Ø
      ,27,32,251,154,176 :REM*56
14ØØ DATA 22,174,211,2,169,1,15
      7,Ø,16Ø,238,22Ø,2,32,235,1
      54,173,226,2,24Ø   :REM*183
14Ø5 DATA 3,32,218,141,173,177,
      2,2Ø1,5,2Ø8,16,32,251,154,
      144,11,169,Ø,157   :REM*244
141Ø DATA Ø,16Ø,2Ø6,22Ø,2,32,23
      5,154,76,219,153,173,215,2
      ,2Ø8,23,173,211,2  :REM*2Ø3
1415 DATA 24Ø,43,2Ø6,211,2,32,2
      43,145,32,179,138,32,172,1
      54,32,226,145,76,219
                         :REM*188
142Ø DATA 153,32,243,145,32,41,
      146,2Ø6,215,2,2Ø6,211,2,16
      Ø,25,32,2Ø1,148,32:REM*251
1425 DATA 226,145,16Ø,25,32,2Ø1
      ,148,76,219,153,174,215,2,
      232,236,216,2,144,27
                         :REM*36
143Ø DATA 174,211,2,232,236,2Ø7
      ,2,176,235,238,211,2,32,24
      3,145,32,9Ø,138,32 :REM*23
1435 DATA 2Ø2,154,32,226,145,76
      ,219,153,32,243,145,32,14,
      146,238,215,2,238,211
                         :REM*18
144Ø DATA 2,76,1Ø5,154,32,217,1
      45,174,211,2,24Ø,8,169,32,
      32,2Ø2,147,2Ø2,2Ø8 :REM*33
1445 DATA 248,169,11,141,181,2,
      169,6,141,182,2,32,76,153,
      96,32,217,145,174 :REM*246
145Ø DATA 211,2,236,2Ø7,2,24Ø,8
      ,169,32,32,2Ø2,147,2Ø2,2Ø8
      ,248,169,23,141,181
                         :REM*199
1455 DATA 2,169,6,141,182,2,32,
      76,153,96,16Ø,13,177,167,7
      3,128,145,167,2ØØ :REM*254
146Ø DATA 192,29,2Ø8,245,96,177
      ,167,174,211,2,189,Ø,16Ø,2
      4Ø,2,56,96,24,96   :REM*189
1465 DATA 195,194,2Ø5,56,48,1,Ø
      ,Ø,Ø,36,48,85,48,62,82,85,
      78,8,195           :REM*42
147Ø DATA 195,19Ø,65,66,186,Ø,6
      2,124,217,31,93,155,1,77,7
      9,86,69,32,67      :REM*183
1475 DATA 85,82,83,79,82,32,84,
      72,69,78,32,8Ø,82,69,83,83
      ,32,83,8Ø          :REM*22Ø
148Ø DATA 65,67,69,32,84,79,32,
      83,69,76,69,67,84,Ø,2,68,8
      2,73,86            :REM*97
1485 DATA 69,58,Ø,3,7Ø,82,69,69
      ,Ø,4,68,82,73,86,69,32,83,
      69,84              :REM*242
149Ø DATA 85,8Ø,255,82,85,78,32
      ,65,32,8Ø,82,79,71,82,65,7
      7,255,7Ø,79        :REM*13
1495 DATA 82,77,65,84,32,65,32,
      68,73,83,75,255,67,76,69,6
      5,78,85,8Ø         :REM*8
15ØØ DATA 32,65,32,68,73,83,75,
      255,77,79,68,69,32,83,69,7
      6,69,67,84         :REM*177
15Ø5 DATA 73,79,78,Ø,5,67,79,8Ø
      ,89,32,7Ø,73,76,69,83,255,
      68,69,76           :REM*234
151Ø DATA 69,84,69,32,7Ø,73,76,
      69,83,255,82,69,78,65,77,6
      9,32,7Ø,73         :REM*1Ø5
1515 DATA 76,69,83,255,7Ø,85,78
      ,67,84,73,79,78,32,75,69,8
      9,83,255,68        :REM*15Ø
152Ø DATA 73,82,69,67,84,79,82,
      89,Ø,6,8Ø,82,69,83,83,32,1
      46,7Ø,53           :REM*37
1525 DATA 18,32,84,79,32,85,78,
      83,69,76,69,67,84,32,47,32
      ,146,83,84         :REM*238
153Ø DATA 79,8Ø,18,32,84,79,32,
      67,65,78,67,69,76,32,Ø,7,3
      2,68,82            :REM*39
1535 DATA 73,86,69,32,65,58,32,
      68,69,86,73,67,69,32,35,32
      ,61,32,56          :REM*8
154Ø DATA 32,32,57,32,32,49,48,
      255,255,32,68,82,73,86,69,
      32,66,58,32        :REM*92
1545 DATA 68,69,86,73,67,69,32,
      35,32,61,32,56,32,32,57,32
      ,32,49,48          :REM*233
155Ø DATA Ø,11,84,72,69,78,32,8
      Ø,82,69,83,83,32,83,8Ø,65,
      67,69,Ø            :REM*152
1555 DATA 14,32,32,32,32,32,83,
      73,9Ø,69,32,32,32,32,32,32
      ,7Ø,73,76          :REM*145
156Ø DATA 69,32,78,65,77,69,32,
      32,32,32,32,32,32,32,84,89
      ,8Ø,69,32          :REM*182
1565 DATA 32,32,32,Ø,15,7Ø,82,7
      9,77,32,87,72,73,67,72,32,
      68,82,73           :REM*45
157Ø DATA 86,69,58,32,65,32,32,
      66,32,Ø,16,68,73,83,75,32,
      67,76,69           :REM*Ø ►
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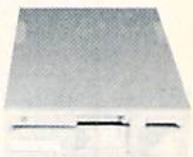
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Circle 155 on Reader Service card.

```
1575 DATA 65,78,45,85,8Ø,32,87,
     79,82,75,73,78,71,32,79,78
     ,32,68,82          :REM*25
158Ø DATA 73,86,69,32,Ø,17,73,7
     8,83,69,82,84,32,68,73,83,
     75,32,73           :REM*178
1585 DATA 78,32,68,82,73,86,69,
     32,Ø,19,32,65,78,68,32,8Ø,
     82,69,83           :REM*25
159Ø DATA 83,32,83,8Ø,65,67,69,
     Ø,2Ø,69,78,84,69,82,32,68,
     73,83,75           :REM*188
1595 DATA 32,78,65,77,69,58,32,
     Ø,21,32,32,32,32,32,32,32,
     32,32,32           :REM*251
16ØØ DATA 32,32,32,32,32,32,32,
     32,32,Ø,22,83,69,84,32,49,
     53,52,49           :REM*196
16Ø5 DATA 32,77,79,68,69,Ø,23,8
     3,69,84,32,49,53,55,49,32,
     77,79,68           :REM*153
161Ø DATA 69,Ø,24,79,75,65,89,3
     2,84,79,32,68,69,76,69,84,
     69,32,7Ø           :REM*8Ø
1615 DATA 73,76,69,45,76,73,83,
     84,32,32,78,32,32,89,32,Ø,
     26,79,75           :REM*5
162Ø DATA 65,89,32,84,79,32,82,
     69,78,65,77,69,32,7Ø,73,76
     ,69,45,76          :REM*98
1625 DATA 73,83,84,32,32,78,32,
     32,89,32,Ø,27,78,69,87,32,
     7Ø,73,76           :REM*41
163Ø DATA 69,32,78,65,77,69,58,
     Ø,28,68,73,83,65,66,76,69,
     32,7Ø,85           :REM*176
1635 DATA 78,67,84,73,79,78,32,
     75,69,89,83,Ø,29,69,78,65,
     66,76,69           :REM*129
164Ø DATA 32,7Ø,85,78,67,84,73,
     79,78,32,75,69,89,83,Ø,3Ø,
     68,69,7Ø           :REM*96
1645 DATA 73,78,69,32,7Ø,85,78,
     67,84,73,79,78,32,75,69,89
     ,83,Ø,31           :REM*145
165Ø DATA 32,7Ø,49,32,32,7Ø,5Ø,
     32,32,7Ø,51,32,32,7Ø,52,32
     ,32,7Ø,53          :REM*48
1655 DATA 32,32,7Ø,54,32,32,7Ø,
     55,32,32,7Ø,56,32,Ø,33,75,
     69,89,61           :REM*125
166Ø DATA 18,32,32,32,32,32,32,
     32,32,32,32,32,32,32,32,32
     ,32,32,32          :REM*1ØØ
1665 DATA 32,32,32,32,32,32,32,
     32,32,32,32,32,Ø,34,73,78,
     83,69,82           :REM*241
167Ø DATA 84,32,67,79,8Ø,89,32,
     68,73,83,75,32,73,78,84,79
     ,32,68,82          :REM*2Ø2
1675 DATA 73,86,69,58,32,Ø,36,3
     2,32,79,75,65,89,32,84,79,
     32,67,79           :REM*89
168Ø DATA 8Ø,89,32,7Ø,73,76,69,
     45,76,73,83,84,32,32,78,32
     ,32,89,32          :REM*15Ø
1685 DATA Ø,37,7Ø,73,76,69,32,6
     7,79,8Ø,89,32,87,79,82,75,
     73,78,71           :REM*131
169Ø DATA 32,7Ø,82,79,77,32,68,
     82,73,86,69,58,32,Ø,38,73,
     78,83,69           :REM*84
1695 DATA 82,84,32,84,65,82,71,
     69,84,32,68,73,83,75,32,65
     ,78,68,32          :REM*217
17ØØ DATA 8Ø,82,69,83,83,32,83,
     8Ø,65,67,69,Ø,4Ø,8Ø,82,79,
     71,82,65           :REM*114
17Ø5 DATA 77,32,73,78,32,77,69,
     77,79,82,89,32,87,73,76,76
     ,32,66,69          :REM*51
171Ø DATA 32,68,69,83,84,82,79,
     89,69,68,Ø,41,73,78,83,69,
     82,84,32           :REM*21Ø
1715 DATA 83,79,85,82,67,69,32,
     68,73,83,75,32,65,78,68,32
     ,8Ø,82,69          :REM*97
172Ø DATA 83,83,32,83,8Ø,65,67,
     69,Ø,42,32,32,32,32,32,79,
     75,65,89           :REM*246
1725 DATA 32,84,79,32,7Ø,79,82,
     77,65,84,32,68,73,83,75,32
     ,32,78,32          :REM*149
173Ø DATA 32,89,32,Ø,17,2,7,1,1
     9,2,7,23,2Ø,6,1Ø,1,21,6,1Ø
                        :REM*244
1735 DATA 17,22,6,11,13,23,6,13
     ,13,26,2,7,3,Ø,Ø,27,6,7,4
                        :REM*81
174Ø DATA 24,2,7,3,28,6,11,9,29
     ,6,13,9,3Ø,6,15,9,31,6,18
                        :REM*1ØØ
1745 DATA 5,33,6,7,Ø,34,6,11,5,
     11,6,13,12,4Ø,6,11,2,36,2
                        :REM*79
175Ø DATA 7,3,37,6,11,5,15,2,7,
     11,8,6,11,7,9,6,13,4,1Ø
                        :REM*4
1755 DATA 6,14,8,11,6,15,12,12,
     6,18,8,13,6,2Ø,5,11,6,21,1
     2                  :REM*85
176Ø DATA 1,11,Ø,1,2,11,9,1,3,1
     1,9,34,4,6,1,2,5,6,1
                        :REM*17Ø
1765 DATA 24,1,2,7,1,6,11,Ø,1,7
     ,6,11,5,16,2,7,3,14,14
                        :REM*1Ø7
177Ø DATA 1Ø,Ø,38,6,11,3,41,6,1
     1,3,42,2,7,3,256   :REM*84
```

Listing 2. The DOS Shell Saver program.

```
1Ø REM DOS SHELL SAVER :REM*196
2Ø INPUT"FILENAME";NM$ :REM*152
3Ø SYS 57812NM$,8,1: POKE 193,1
   96:POKE 194,134      :REM*24
4Ø POKE 174,156:POKE 175,159:SY
   S 62957              :REM*32
5Ø PRINT"SAVE COMPLETE. CHECK D
   RIVE FOR ERRORS"     :REM*146
```

■

From p. 62.

```
    +STR$(WC)+" OF"+STR$(C)+" W
    ORDS{CTRL 8}":GOSUB72Ø:V=11
    47:EC=Ø             :REM*9Ø
245 MT=Ø:M1=Ø:PRINT"{HOME}{CRSR
     DN}LETTER ?";:POKE198,Ø
                        :REM*99
25Ø WAIT198,1:GETG$:IFASC(G$)=1
    33ANDRR=ØTHEN795    :REM*26
255 IFASC(G$)<65ORASC(G$)>9ØTHE
    N25Ø                :REM*85
26Ø ON((CT>Ø)+2)GOSUB3Ø5:ONM1GO
    TO245:FORF=1TOL:IFG$=ER$(F)
    THEN3ØØ             :REM*253
265 NEXT:ON((CT=L)+2)GOTO325:ON
    MTGOTO245:EC=EC+1:IFEC>9THE
    NGOSUB715:GOTO32Ø   :REM*34
27Ø ONECGOSUB64Ø,65Ø,66Ø,665,68
    5,69Ø,7ØØ,7Ø5,71Ø:POKEV,ASC
    (G$)-64:V=V+2       :REM*1Ø5
275 IFEC<>7THEN245      :REM*164
28Ø POKES1,7:FORT=1TO2Ø:POKES+2
    4,15:POKES+1,11Ø:POKES+5,9:
    POKES+6,9:POKES+4,17
                        :REM*189
285 POKES+4,16:NEXT:POKES1,Ø
                        :REM*23Ø
29Ø IFAL=1THENPRINT"{5 CRSR DNs
    }{CTRL 2}{3 SPACEs}THIS WIL
    L {CTRL 8}NOT{CTRL 2} SAVE
    YOUR WORD LIST{CTRL 8}":RET
    URN                 :REM*49
295 GOTO245             :REM*2Ø2
3ØØ POKE1263+F,ASC(G$)-64:MT=1:
    CT=CT+1:G$(CT)=G$:GOTO265
                        :REM*97
3Ø5 FORT=1TOCT:IFG$=G$(T)THENM1
    =1                  :REM*148
31Ø NEXT:RETURN         :REM*251
315 PRINT"{SHFT CLR}":X=12:Y=13
    :Z$="USED ALL WORDS":GOSUB7
    2Ø:FORT=1TO25ØØ:NEXT:GOTO33
    Ø                   :REM*118
32Ø PRINT"{HOME}{6 CRSR DNs}";W
    D$(R):GOSUB755:ON((WC=C)+2)
    GOTO315:GOTO155     :REM*255
325 PRINT"{HOME}{9 CRSR DNs}{2
    CRSR RTs}{CTRL 9}CORRECT{CT
    RL Ø}":GOSUB755:ON((WC=C)+2
    )GOTO315:GOTO155    :REM*32
33Ø POKE53281,Ø:PRINT"{SHFT CLR
    }":LE=5:DO=4:WI=3Ø:DE=14:GO
    SUB91Ø              :REM*221
335 LE=7:DO=6:WI=26:DE=1Ø:GOSUB
    91Ø                 :REM*22Ø
34Ø GW=WC-MW:PRINT"{HOME}"TAB(1
    73)"{CTRL 8}{4 CRSR DNs}MIS
    SED WORDS =";MW:POKE198,Ø
                        :REM*255
345 PRINTTAB(12)"{CRSR DN}CORRE
    CT WORDS =";GW:PRINTTAB(27)
    "{3 COMD Ys}{CRSR DN}"
                        :REM*152
35Ø PRINTTAB(14)"TOTAL WORDS ="
    ;WC                 :REM*1Ø9
355 PRINTTAB(253)"{CRSR DN}{CTR
    L 4}"+P$:WAIT198,1  :REM*68
36Ø PRINT"{SHFT CLR}{CTRL 8}{3
    CRSR DNs}{4 SPACEs}DO YOU W
    ISH TO PLAY AGAIN?{2 SPACEs
```

```
}{CTRL 9}Y/N":POKE198,Ø
                        :REM*17
365 GETA$:IFA$="N"THENPRINT"{SH
    FT CLR}":POKE788,49:END
                        :REM*2Ø2
37Ø ON((A$="Y")+2)GOTO155:GOTO3
    65                  :REM*21
375 X=1Ø:Y=3:Z$="PRESS {CTRL 9}
    C{CTRL Ø} TO CREATE A NEW F
    ILE":GOSUB72Ø:X=9:Y=9:Z$="{
    COMD @}"            :REM*134
38Ø GOSUB72Ø            :REM*151
385 X=12:Y=9:GOSUB72Ø:X=13:Y=3:
    Z$="PRESS {CTRL 9}E{CTRL Ø}
     TO EDIT AN EXISTING FILE":
    GOSUB72Ø            :REM*12Ø
39Ø GETA$:IFA$<>"C"ANDA$<>"E"TH
    EN39Ø               :REM*165
395 IFA$="E"THENCLR:RW=1:GOSUB1
    Ø5:WW=1:ED=1:GOTO525
                        :REM*218
4ØØ CLR:RW=1:GOSUB1Ø5:PRINT"{2
    CRSR DNs} ENTER # OF WORDS{
    CRSR DN}":INPUT"{3 SPACEs}{
    CTRL 9}MAXIMUM{CTRL Ø} OF 2
    Ø";WD$              :REM*231
4Ø5 WD=VAL(WD$):IFWD>2ØORWD<1TH
    EN155               :REM*15Ø
41Ø PRINT"{3 CRSR DNs}{CRSR RT}
    INCLUDE DEFINITIONS? {CTRL
    9}Y/N{CTRL Ø}"      :REM*11
415 GETA$:IFA$<>"Y"ANDA$<>"N"TH
    EN415               :REM*5Ø
42Ø IFA$="Y"THENDF=1    :REM*177
425 AJ$=" ":PRINT"{SHFT CLR}{5
    SPACEs}MAXIMUM LENGTH = 16
    CHARACTERS{HOME}{CRSR DN}":
    FORI=1TOWD          :REM*128
43Ø IFI>9THENAJ$=""     :REM*133
435 ONWWGOTO775:PRINTAJ$;I;"{2
    SPACEs}{2 CRSR LFs}";:INPUT
    WD$(I)              :REM*36
44Ø IFWD$(I)=""ORLEN(WD$(I))>16
    THENGOSUB79Ø:GOTO435
                        :REM*125
445 NEXT                :REM*2ØØ
45Ø PRINTTAB(12)"{CRSR DN}WORDS
     O.K.? {CTRL 9}Y/N{CTRL Ø}"
    :GETA$:IFA$="N"THENWW=1:GOT
    O425                :REM*213
455 IFA$<>"Y"THENPRINT"{3 CRSR
    UPs}":GOTO45Ø       :REM*118
46Ø IFDF=1ORED=1THENGOSUB8ØØ
                        :REM*31
465 ONEDGOTO96Ø         :REM*82
47Ø PRINT"{SHFT CLR}{2 CRSR DNs
    } ENTER FILE NAME (MAX OF 1
    3 CHARACTERS){CRSR DN}"
                        :REM*21
475 A$="":PRINTTAB(5)"(PRESS {C
    TRL 9}RETURN{CTRL Ø} TO";
                        :REM*26
48Ø PRINT" EXIT TO MENU){CRSR D
    N}":ID$="":INPUTID$:IFID$="
    "THENAL=1:GOSUB28Ø:GOSUB56Ø
                        :REM*211
485 ON((A$="Y")+2)GOTO155:ON((A
    $="N")+2)GOTO47Ø    :REM*136
49Ø IFLEN(ID$)>13THENPRINT"{SHF
    T CLR}{CRSR DN}{2 CRSR RTs}
    "+LL$:GOSUB77Ø:GOTO47Ø
                        :REM*1Ø7
495 OPEN15,8,15:OPEN5,8,5,"Ø:WM
    "+ID$+",S,W":GOSUB76Ø:IFET
    =8THEN47Ø           :REM*44
5ØØ FORM=1TOWD:IFDF$(M)=""THEND
    F$(M)="."           :REM*1Ø5
5Ø5 NEXT                :REM*4
51Ø FORDC=1TOWD:PRINT#5,WD$(DC)
    ;CR$;DF$(DC):NEXT:GOSUB76Ø:
    IFET=8THEN155       :REM*89
515 CLOSE5:CLOSE15:CLR:RW=1:GOS
    UB1Ø5:GOTO155       :REM*63
52Ø CLR:RW=1:GOSUB1Ø5   :REM*146
525 ON((SF=1)+2)GOTO595:C=1:PRI
    NT"{SHFT CLR}{3 CRSR DNs}EN
    TER FILE NAME:"     :REM*2Ø7
53Ø PRINTTAB(6)"{CRSR DN}(PRESS
     {CTRL 9}${CTRL Ø} & {CTRL
    9}RETURN{CTRL Ø} FOR DIRECT
    ORY)"               :REM*52
535 PRINT"{4 SPACEs}DEPRESSING
    SHIFT KEY STOPS SCROLLING":
    POKE198,Ø           :REM*69
54Ø PRINTTAB(7)"(PRESS {CTRL 9}
    RETURN{CTRL Ø} TO EXIT TO M
    ENU){CRSR DN}":PRINT:ID$=""
    :INPUTID$           :REM*152
545 IFID$=""THENSF=Ø:C=Ø:GOTO15
    5                   :REM*195
55Ø IFID$<>"$"THEN56Ø   :REM*13Ø
555 PRINT"{SHFT CLR}":GOSUB6Ø5:
    PRINTTAB(14)"{CRSR DN}{CTRL
     2}"+P$+"{CTRL 8}":WAIT198,
    1:ONSFGOTO595:ONEDGOTO525
                        :REM*75
56Ø IFSF=1ORAL=1THENPRINTTAB(12
    )"{CRSR DN}{CTRL 2}ARE YOU
    SURE? {CTRL 9}Y/N{CTRL Ø}{C
    TRL 8}":GOTO61Ø     :REM*118
565 IFID$="$"THEN52Ø    :REM*15
57Ø OPEN15,8,15:OPEN5,8,5,"Ø:WM
    "+ID$+",S,R":GOSUB76Ø:IFET
    =8THEN155           :REM*114
575 IFEN=62THENGOSUB765:ONEDGOT
    O525:GOTO52Ø        :REM*87
58Ø INPUT#5,WD$(C),DF$(C):C=C+1
    :IFST=ØTHEN58Ø      :REM*174
585 CLOSE15:CLOSE5:C=C-1:IFED=1
    THENWD=C:GOTO425    :REM*2Ø1
59Ø GOTO155             :REM*25Ø
595 PRINT"{SHFT CLR}{CRSR DN} E
    NTER FILE NAME {CTRL 9}EXAC
    TLY{CTRL Ø} AS SHOWN":PRINT
    " ON THE DIRECTORY" :REM*55
6ØØ SF=1:GOTO53Ø        :REM*218
6Ø5 SYS83Ø:OPEN15,8,15:GOSUB76Ø
    :CLOSE15:ON((ET=8)+2)GOTO52
    5:RETURN            :REM*189
61Ø GETA$:IFA$<>"Y"ANDA$<>"N"TH
    EN61Ø               :REM*238
615 IFAL=1THENAL=Ø:RETURN
                        :REM*119
62Ø IFA$="N"THEN595     :REM*82
625 OPEN15,8,15:OPEN5,8,5,"Ø:"+
    ID$+",S,R":GOSUB76Ø:IFET=8T
    HEN595              :REM*53
63Ø IFEN=62THENGOSUB765:GOTO595
                        :REM*64
635 CLOSE5:PRINT#15,"SØ:"+ID$:C
    LOSE15:GOTO595      :REM*191
64Ø X=Ø:Y=28:Z$="{SHFT U}{3 SHF
    T *s}{SHFT I}":GOSUB72Ø:FOR
    X=1TO2:Z$="{SHFT -}{3 SPACE
    s}{SHFT -}":GOSUB72Ø:NEXT:Y
    =24                 :REM*62
645 Z$="{SHFT J}{2 SHFT *s}{COM
    D R}{SHFT K}{3 SPACEs}{SHFT
     J}{COMD R}{2 SHFT *s}{SHFT
     K}":GOSUB72Ø:RETURN
                        :REM*159
65Ø X=4:Y=27:Z$="{SHFT -}{SHFT
    W}{3 SPACEs}{SHFT W}{SHFT -
    }":GOSUB72Ø:X=5:Z$="{SHFT -
    }{2 SPACEs}{SHFT S}{2 SPACE
    s}{SHFT -}":GOSUB72Ø:X=6:Z$
    ="{SHFT -}{SHFT J}{3 SHFT *
    s}{SHFT K}{SHFT -}" :REM*34
655 GOSUB72Ø:X=7:Z$="{SHFT J}{S
    HFT *}{SHFT I} {SHFT U}{SHF
    T *}{SHFT K}":GOSUB72Ø:RETU
    RN                  :REM*47
66Ø X=8:Y=29:Z$="{CTRL 6}{SHFT
    LB.}{SHFT Q}{COMD *}{CTRL 8
    }":GOSUB72Ø:RETURN :REM*178
665 X=9:Y=23:Z$="{SHFT U}{13 SH
    FT *s}{SHFT I}":GOSUB72Ø:X=
    1Ø:Z$="{SHFT -}{SHFT U}{SHF
    T I}{9 SPACEs}{SHFT U}{SHFT
     I}{SHFT -}":GOSUB72Ø
                        :REM*113
67Ø FORX=11TO15:Z$="{3 SHFT -s}
    {9 SPACEs}{3 SHFT -s}":GOSU
    B72Ø:NEXT:Z$="{2 SHFT -s}{C
    OMD Q}{3 SHFT *s}{COMD R}{S
    HFT *}{COMD R}{3 SHFT *s}{C
    OMD W}{2 SHFT -s}" :REM*238
675 GOSUB72Ø:X=17       :REM*1Ø5
68Ø Z$="MM{SHFT J}{COMD R}{SHFT
     *}{COMD R}{COMD E}{SHFT *}
    {COMD E}{COMD R}{SHFT *}{CO
    MD R}{SHFT K}MM":GOSUB72Ø:R
    ETURN               :REM*166
685 Y=26:FORX=18TO2Ø:Z$="{SHFT
    -} {SHFT -}{3 SPACEs}{SHFT
    -} {SHFT -}":GOSUB72Ø:NEXT:
    RETURN              :REM*91
69Ø Y=26:X=21:Z$="{COMD Q}{SHFT
     *}{COMD W}{3 SPACEs}{COMD
    Q}{SHFT *}{COMD W}":GOSUB72
    Ø:X=22:Y=24:Z$="{SHFT U}{SH
    FT *}{SHFT K} {SHFT -}{3 SP
    ACEs}{SHFT -} {SHFT J}{SHFT
     *}{SHFT I}":GOSUB72Ø
                        :REM*15Ø
695 X=23:Z$="{SHFT J}{3 SHFT *s
    }{SHFT K}{3 SPACEs}{SHFT J}
    {3 SHFT *s}{SHFT K}":GOSUB7
    2Ø:RETURN           :REM*143
7ØØ X=1:Y=3Ø:Z$="{CTRL 2}*{CTRL
     8}":GOSUB72Ø:RETURN:REM*46
7Ø5 Y=3Ø:FORX=11TO15STEP2:Z$="{
    SHFT Q}":GOSUB72Ø:NEXT:RETU
    RN                  :REM*1Ø5
71Ø Y=27:X=1Ø:Z$="{2 COMD Ps}{3
     SPACEs}{2 COMD Ps}":GOSUB7
    2Ø:X=11:Z$="{SHFT M}{SHFT N ►
```

```
} {SHFT Q} {SHFT M}{SHFT N}
":GOSUB72Ø:RETURN  :REM*226
715 X=6:Y=28:Z$="{SHFT U}{3 SHF
T *s}{SHFT I}":GOSUB72Ø:MW=
MW+1:RETURN  :REM*157
72Ø POKE781,X:POKE782,Y:SYS6552
Ø:PRINTZ$:RETURN  :REM*252
725 PRINTTAB(12)"{CTRL 3}* * *
* * * * * *":RETURN :REM*27
73Ø PRINTTAB(12)"*"SPC(15)"*":R
ETURN  :REM*144
735 PRINT"{SHFT CLR}{3 CRSR DNs
}"TAB(255)"MUST USE A":PRIN
TTAB(15)"{2 CRSR DNs}{CTRL
9}HIGHLIGHTED"  :REM*255
74Ø PRINTTAB(17)"{2 CRSR DNs}NU
MBER":FORT=1TO2ØØØ:NEXT:GOT
O155  :REM*112
745 PRINT"{SHFT CLR}"TAB(253)"{
2 CRSR DNs}NO WORDS IN MEMO
RY":PRINTTAB(14)"{CRSR DN}O
PTION {CTRL 9}4{CTRL Ø} TO
LOAD"  :REM*1Ø5
75Ø PRINTTAB(93)"THEN PRESS {CT
RL 9}RETURN{CTRL 2}":X=22:Y
=14:Z$=P$:GOSUB72Ø:WAIT198,
1:GOTO155  :REM*134
755 X=15:Y=1:Z$="{COMD 6}* "+P$
+" *{CTRL 8}":GOSUB72Ø:WAIT
198,1:RETURN  :REM*119
76Ø INPUT#15,EN,EM$,ET,ES:IF(EN
<2Ø)OR(EN=62)THENET=Ø:RETUR
N  :REM*16Ø
765 PRINT"{7 CRSR DNs} {CTRL 9}
{CTRL 2}DISK ERROR{CTRL Ø}"
EN"{CRSR LF}, "EM$","ET"{CR
SR LF},"ES"{CTRL 8}":ET=8
  :REM*79
77Ø PRINT"{CRSR DN}{7 SPACEs}"+
P$+" TO CONTINUE":WAIT198,1
:CLOSE5:CLOSE15:POKE198,Ø:R
ETURN  :REM*95
775 PRINTAJ$;I;"{2 SPACEs}{CTRL
9}";WD$(I):WD$(I)="":PRINT
"{CRSR UP}{3 CRSR RTs} ";:I
NPUTWD$(I)  :REM*244
78Ø IFWD$(I)=""ORLEN(WD$(I))>16
THENWD$(I)="":GOSUB79Ø:GOTO
775  :REM*227
785 NEXT:GOTO45Ø  :REM*116
79Ø X=I+1:Y=3:Z$=SP$+"{CRSR UP}
":GOSUB72Ø:RETURN  :REM*95
795 Y=INT((38-(LEN(DF$(R))))/2)
:X=24:Z$="{CTRL 2}*"+DF$(R)
+"*{CRSR UP}{CTRL 8}":GOSUB
72Ø:GOTO245  :REM*218
8ØØ FORLO=1TOI-1:IFLO>1THENGOSU
B895:ONED+1GOTO9ØØ:PRINT"{H
OME}{2 CRSR DNs}":GOTO815
  :REM*89
8Ø5 LE=1:DO=7:WI=38:DE=3:REM*74
81Ø PRINT"{SHFT CLR}{CRSR DN}{C
TRL 2}"TAB(11)"DEFINITION{2
SPACEs}SCREEN":PRINTTAB(1Ø
)"{CTRL 8}{2Ø COMD Ys}"
  :REM*2Ø7
815 XA=INT(32-(LEN(WD$(LO))))/2
:PRINTTAB(XA+4):FORI=1TOLEN
(WD$(LO)):PRINT"{CTRL 2}{CO
MD P}";  :REM*4
82Ø NEXT:PRINT  :REM*173
825 PRINTTAB(XA)"{CTRL 8}*** {C
TRL 9}{CTRL 2}"WD$(LO)"{CTR
L Ø}{CTRL 8} ***":PRINTTAB(
36)"{COMD 6}"LO:GOSUB91Ø
  :REM*236
83Ø PRINT"{CRSR DN}":PRINTTAB(3
)"{CRSR DN}{CTRL 8}TOTAL NU
MBER OF CHARACTERS CAN NOT"
  :REM*87
835 PRINTTAB(5)"EXCEED {CTRL 9}
{CTRL 2}36{CTRL 8}{CTRL Ø}.
{2 SPACEs}(INCLUDING SPACES
){CTRL 2}{CRSR DN}":IFED=1A
NDE2=ØTHENGOTO85Ø  :REM*194
84Ø POKE19,64:X=17:Y=2:Z$="----
----------{UP ARROW}{CRSR UP}":GO
SUB72Ø  :REM*211
845 INPUT"{2 CRSR RTs}{CRSR UP}
.{CRSR LF}";DF$(LO):E2=Ø:IF
LEN(DF$(LO))>36THENE2=1:GOT
O88Ø  :REM*6
85Ø XA=INT(4Ø-(LEN(DF$(LO))))/2
:X=8:Y=XA:Z$="{CTRL 2}"+DF$
(LO):GOSUB72Ø  :REM*163
855 PRINT"{6 CRSR DNs}"TAB(249)
"PRESS {CTRL 9}RETURN{CTRL
Ø} TO ACCEPT{CRSR DN}"
  :REM*44
86Ø PRINTTAB(8)"{CTRL 9}SHIFT{C
TRL Ø} {CTRL 9}RETURN{CTRL
Ø} TO RE-ENTER"  :REM*51
865 GETA$:ON((A$=CHR$(13))+2)GO
TO87Ø:ON((A$=CHR$(141))+2)G
OTO89Ø:GOTO865  :REM*182
87Ø IFED=1THENGOSUB895  :REM*7
875 NEXT:PRINT"{SHFT CLR}{CTRL
8}":RETURN  :REM*44
88Ø PRINTTAB(137)"{CTRL 8}{CTRL
9}TOO{CTRL Ø} {CTRL 9}LONG
{CTRL 2}":PRINTTAB(88)P$+"
TO RE-ENTER"  :REM*1Ø9
885 WAIT198,1:GETA$:GOTO81Ø
  :REM*222
89Ø X=8:Y=2:Z$=SP$:GOSUB72Ø:GOT
O9ØØ  :REM*125
895 Y=2:Z$=SP$:FORX=3TO4:GOSUB7
2Ø:NEXT:X=8:GOSUB72Ø:RETURN
  :REM*156
9ØØ FORX=2ØTO23:GOSUB72Ø:NEXT:I
FED=ØTHENPRINT"{HOME}{2 CRS
R DNs}":GOTO815  :REM*127
9Ø5 GOTO84Ø  :REM*19Ø
91Ø POKE211,LE:POKE214,DO:PRINT
"{CRSR UP}";:FORB=1TOWI:PRI
NT"{CTRL 3}{COMD P}";:NEXT:
PRINT  :REM*119
915 FORB=1TODE:PRINTTAB(LE);"{C
OMD J}";TAB(LE+WI-1)"{COMD
L}"  :REM*242
92Ø PRINT"{CRSR UP}":NEXT:POKE2
11,LE:POKE214,DO+DE+1:PRINT
"{CRSR UP}";:FORB=1TOWI:PRI
NT"{COMD Y}";  :REM*155
925 NEXT:RETURN  :REM*1ØØ
93Ø DATA169,2,162,176,16Ø,3,32,
189,255,169,1,162,8,16Ø,Ø,3
2,186,255,32,192  :REM*3
935 DATA255,24,162,1,32,198,255
,176,75,32,2Ø7,255,32,2Ø7,2
55,169,13,32,21Ø,255 :REM*Ø
94Ø DATA32,2Ø7,255,32,2Ø7,255,3
2,2Ø7,255,133,252,32,2Ø7,25
5,133,251,165,144  :REM*219
945 DATA2Ø8,44,165,251,166,252,
32,2Ø5,189,169,32,32,21Ø,25
5,32,2Ø7,255,32,21Ø:REM*148
95Ø DATA255,174,141,2,2Ø8,251,1
66,145,224,127,24Ø,15,32,2Ø
7,255,1Ø5,Ø,2Ø8,235 :REM*83
955 DATA169,13,32,21Ø,255,76,1Ø
2,3,24,169,1,32,195,255,32,
2Ø4,255,96,36,48  :REM*84
96Ø PRINT"{SHFT CLR}{3 CRSR DNs
}{2 CRSR RTs}SAVE THIS FILE
USING THE":PRINT"{CRSR DN}
{2 CRSR RTs}{CTRL 9}ORIGINA
L{CTRL Ø} NAME OF--{CTRL 9}
{CTRL 2}";ID$  :REM*217
965 PRINTTAB(13)"{2 CRSR DNs}PR
ESS {CTRL 9}Y/N{CTRL 8}{CTR
L Ø}"  :REM*13Ø
97Ø GETA$:IFA$<>"Y"ANDA$<>"N"GO
TO97Ø  :REM*85
975 ONPPGOTO1Ø1Ø,1Ø15,1Ø2Ø:IFA$
="N"GOTO47Ø  :REM*42
98Ø OPEN15,8,15:OPEN5,8,5,"@Ø:W
M "+ID$+",S,W":GOSUB76Ø:IFE
T=8THEN96Ø  :REM*177
985 GOTO5ØØ  :REM*182
99Ø IFID$=""THEN745  :REM*35
995 PRINT"{SHFT CLR}{2 CRSR DNs
}{2 CRSR RTs}THE NAME OF TH
E FILE{CRSR DN}":PRINT"{2 C
RSR RTs}THAT WILL PRINT IS-
- {CTRL 9}{CTRL 2}";ID$
  :REM*2Ø4
1ØØØ PRINT"{CTRL 8}"  :REM*145
1ØØ5 PRINTTAB(6)"{2 CRSR DNs} I
S THIS THE CORRECT FILE?":
PP=1:GOTO965  :REM*16Ø
1Ø1Ø ON((A$="N")+2)GOTO155:PRIN
T"{2 CRSR DNs}{9 SPACEs}IS
THE PRINTER READY?":PP=2:
GOTO965  :REM*193
1Ø15 ON((A$="N")+2)GOTO155:PRIN
T"{2 CRSR DNs}{9 SPACEs}IN
CLUDE DEFINITIONS?":PP=3:G
OTO965  :REM*226
1Ø2Ø OPEN4,4:XA=INT(8Ø-(LEN(ID$
)))/2:GOSUB1Ø45:PRINT#4,""
TAB(XA);ID$:GOSUB1Ø45
  :REM*61
1Ø25 PRINT#4,CHR$(1Ø):FORX=1TOC
:IFA$="Y"THEN1Ø35 :REM*163
1Ø3Ø PRINT#4,"{3 SPACEs}"WD$(X)
,CHR$(1Ø):NEXT:CLOSE4:GOTO
155  :REM*166
1Ø35 PRINT#4,"{3 SPACEs}"WD$(X)
;""TAB(25-LEN(WD$(X)));DF$
(X),CHR$(1Ø):NEXT :REM*239
1Ø4Ø CLOSE4:GOTO155  :REM*42
1Ø45 FORX=1TO8Ø:PRINT#4,"-";:NE
XT:RETURN  :REM*249
```

■

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
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:N
   EXT
4Ø IFT<>16251 THEN PRINT"ERROR IN DATA..."
   :END
6Ø POKEML+4,PG:POKEML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,
   PG
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   ************************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TY
   PIST IS NOW ACTIVE{2 SPACEs}**"
1ØØ PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs
    }SYS"ML+3Ø"=OFF **"
1Ø1 PRINT"{CRSR RT}**********************
    ***************":NEW
11Ø DATA 173,ØØ5,ØØ3,2Ø1,ØØ3,2Ø8,ØØ1,Ø96
12Ø DATA 141,1Ø5,ØØ3,173,ØØ4,ØØ3,141,1Ø4
13Ø DATA ØØ3,162,1Ø3,16Ø,ØØ3,142,ØØ4,ØØ3
14Ø DATA 14Ø,ØØ5,ØØ3,Ø96,234,234,173,1Ø4
15Ø DATA ØØ3,141,ØØ4,ØØ3,173,1Ø5,ØØ3,141
16Ø DATA ØØ5,ØØ3,Ø96,Ø32,124,165,132,Ø11
17Ø DATA 162,ØØØ,142,24Ø,ØØ3,142,241,ØØ3
18Ø DATA 189,ØØØ,ØØ2,24Ø,Ø51,2Ø1,Ø32,2Ø8
19Ø DATA ØØ4,164,212,24Ø,Ø4Ø,2Ø1,Ø34,2Ø8
2ØØ DATA ØØ8,Ø72,165,212,Ø73,ØØ1,133,212
21Ø DATA 1Ø4,Ø72,238,241,ØØ3,173,241,ØØ3
22Ø DATA Ø41,ØØ7,168,1Ø4,Ø24,Ø72,Ø24,1Ø4
23Ø DATA Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1Ø9
24Ø DATA 24Ø,ØØ3,141,24Ø,ØØ3,232,2Ø8,2ØØ
25Ø DATA 173,24Ø,ØØ3,Ø24,1Ø1,Ø2Ø,Ø24,1Ø1
26Ø DATA Ø21,141,24Ø,ØØ3,169,Ø42,Ø32,21Ø
27Ø DATA 255,169,ØØØ,174,24Ø,ØØ3,Ø32,2Ø5
28Ø DATA 189,162,ØØ3,189,211,ØØ3,Ø32,21Ø
29Ø DATA 255,2Ø2,Ø16,247,164,Ø11,Ø96,145
3ØØ DATA Ø13,Ø32,Ø32
```

Listing 2. 128 Perfect Typist program.

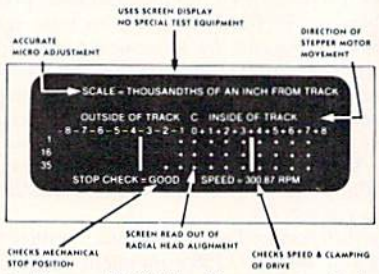
```
1 REM 4Ø/8Ø COL C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
1Ø FORX=512ØTO5379:READD:T=T+D:POKEX,D
2Ø NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}E
   RROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{2Ø SPACEs}"
3Ø PRINT"{SHFT CLR}"A$" ****************
   ******************"
4Ø PRINTA$" ** 128 PERFECT TYPIST IS NOW A
   CTIVE **"
5Ø PRINTA$" **{2 SPACEs}SYS 512Ø=ON{7 SPAC
   Es}SYS 515Ø=OFF{2 SPACEs}**"
6Ø PRINTA$" **************************
   ********":SYS512Ø:NEW
7Ø DATA 173,5,3,2Ø1,2Ø,2Ø8,1,96,141,45,2Ø,
   173,4,3,141,44,2Ø,162,43,16Ø,2Ø
8Ø DATA 142,4,3,14Ø,5,3,96,234,234,173,44,
   2Ø,141,4,3,173,45,2Ø,141,5,3,96
9Ø DATA 32,13,67,14Ø,255,19,162,Ø,142,252,
   19,142,253,19,142,254,19,189,Ø,2
1ØØ DATA 2Ø1,32,24Ø,8,2Ø1,48,144,7,2Ø1,58,
    176,3,232,2Ø8,238,189,Ø,2,24Ø,54
11Ø DATA 2Ø1,32,2Ø8,5,172,254,19,24Ø,42,2Ø
    1,34,2Ø8,1Ø,72,173,254,19,73,1
12Ø DATA 141,254,19,1Ø4,72,238,253,19,173,
    253,19,41,7,168,1Ø4,24,72,24,1Ø4
13Ø DATA 16,1,56,42,136,16,246,1Ø9,252,19,
    141,252,19,232,2Ø8,197,173,252
14Ø DATA 19,24,1Ø1,22,24,1Ø1,23,141,252,19
    ,169,42,32,241,2Ø,32,188,2Ø,16Ø
15Ø DATA 2,185,185,2Ø,32,241,2Ø,136,16,247
    ,165,116,2Ø8,9,165,117,2Ø8,5,169
16Ø DATA 145,32,241,2Ø,172,255,19,96,13,32
    ,32,162,Ø,173,252,19,232,56,233
17Ø DATA 1ØØ,176,25Ø,1Ø5,1ØØ,2Ø2,24Ø,3,32,
    232,2Ø,2Ø1,1Ø,176,5,2Ø5,252,19
18Ø DATA 24Ø,15,162,Ø,232,56,233,1Ø,16,25Ø
    ,24,1Ø5,1Ø,2Ø2,32,232,2Ø,17Ø,72
19Ø DATA 138,9,48,32,241,2Ø,1Ø4,96,17Ø,173
    ,Ø,255,72,169,Ø,141,Ø,255,138,32
2ØØ DATA 21Ø,255,1Ø4,141,Ø,255,96
```

■

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From p. 15.

```
   ES=1:SPRSAV SN,A$:GSHAPE A$,2Ø,2Ø
4Ø CHAR 1,9,13,CHR$(14)+"{SHFT W}ORKING...
   {SHFT P}LEASE {SHFT W}AIT"
5Ø FOR I=1TO7:ES=ES-.1:EY=ES+.Ø6:PX=1:PY=1

6Ø FOR XX=ØTO24:FORYY=ØTO21
7Ø LOCATE XX+2Ø,YY+2Ø:IFRDOT(2)<>ØTHEN GOS
   UB 12Ø
8Ø NEXTYY,XX,I:SPRSAVA$,1:PRINT"{SHFT CLR}
   "
9Ø FOR I=1TO7:SSHAPE B$(I+1),I*25+21,5Ø,I*
   25+43,71:NEXT:GRAPHICØ
1ØØ FOR I=1TO8:SPRITE I,1,1,1:MOVSPR I,5Ø+
    3Ø*I,115:SPRSAV B$(I),I
11Ø NEXT:END
12Ø X1=((I*25)+((XX*ES)+(12-(12*ES))))+2Ø:
    Y1=5Ø+((YY*EY)+(1Ø-(1Ø*EY)))
13Ø DRAW 1,X1,Y1:RETURN
```

—Marco Hagelsieb, Guadalajara, Jalisco, Mexico

$446 Magic 80-Column Cursor

Unlike on the C-64, it's easy to program a blinking cursor on your C-128's 80-column screen. You need only turn the 8563 video display chip's Cursor mode on, then off when you're done.

To turn it on, enter BANK15:SYS49182,70. This prints an escape/F through the escape character routine at $C01E. The accumulator contains the value for the character F. Use SYS 52684,16,10 to turn the Cursor mode off. This writes to register 10 in the 8563 by calling the screen editor routine at $CDCC in bank 15. The X register must contain the value for the 8563's register, while the accumulator holds the data you wish to write (in this case, 16). The demo program below shows how to put the magic cursor to work in your own programs.

```
1Ø REM MAGIC CURSOR DEMO-BOB KODADEK
2Ø IFPEEK(215)=ØTHENPRINT"8Ø COL ONLY!":EN
   D
3Ø PRINT:PRINT"1. VIEW DIRECTORY"
4Ø PRINT"2. LIST PROGRAM"
5Ø PRINT"3. QUIT DEMO":PRINT
6Ø PRINT"ENTER CHOICE: ";
7Ø BANK 15:SYS49182,7Ø:REM CURSOR ON
8Ø GETKEY A$:K=VAL(A$):IFK<1ORK>3THEN8Ø
9Ø PRINT A$:SYS52684,16,1Ø:REM CURSOR OFF
1ØØ ON K GOSUB 12Ø,13Ø,14Ø
11Ø IF K<>3THEN3Ø:ELSE END
12Ø CATALOG:RETURN
13Ø LIST:RETURN
14Ø PRINT"ALL DONE!":RETURN
```

—Bob Kodadek, Aston, PA

$447 80-Column Toggler

Use this simple ML program to toggle between two 80-column screens. Type in the listing below and run it for a brief demo. Note that you should always clear the second screen the first time it's accessed. One warning: If you have

any bank-switching in your program, remember that my routine will always exit in bank 15.

```
10 REM TOGGLER 80-EDWARD B SULLIVAN
20 PA=4864:FORX=PATOPA+51:READE:POKEX,E:C=
   C+E:NEXT
30 IFC<>5611THENPRINT"ERROR!":STOP
40 DATA 169,0,141,0,255,162,12,32,204,205,
   141,46,10,169,8,162,20,32,204,205
50 DATA 141,47,10,96,234,169,0,141,0,255,1
   69,16,162,12,32,204,205,141,46,10
60 DATA 169,24,162,20,32,204,205,141,47,10
   ,96,234
70 S1=PA:S2=PA+25: REM ** DEMO
80 PRINT"{SHFT CLR}":KEY1,"SYS"+STR$(S1)+C
   HR$(13):KEY2,"SYS"+STR$(S2)+CHR$(13)
90 DIRECTORY:PRINT"SCREEN #1 IS THE DEFAUL
   T SCREEN":GETKEYA$
100 SYS S2:PRINT"{SHFT CLR}ALWAYS CLEAR SC
    REEN # 2 THE FIRST TIME ACCESSED":LIST
    :GETKEYA$
110 SYSS1:GETKEYA$:SYSS2:GETKEYA$:GOTO110
```

—Edward B. Sullivan, Branson, MO

$448 C-64 Metronome

Here's a program that will transform your C-64 into an instrument for marking time. The program produces an animated screen display with a metronome-like sound and runs until you press any key.

```
10 PRINT"{SHFT CLR}C-64 METRONOME - JOSEPH
    R. CHARNETSKI"
20 INPUT "{CRSR DN}BEATS PER MINUTE (40-20
   8)";N
30 IFN<40 OR N>208THEN END
40 FORI=1TO9
50 B$=B$+"{SHFT M}{CRSR DN}":C$=C$+"{CRSR
   UP} "
60 D$=D$+" {CRSR DN}":E$=E$+"{CRSR UP}{SHF
   T N}"
70 NEXT
80 H$="{HOME}{9 CRSR DNs}{10 CRSR RTs}"
90 A$(0)=H$+B$+"*"+C$:A$(1)=H$+D$+"*"+E$
100 S=54272:FORJ=STOS+23:POKEJ,0:NEXT
110 POKES+1,84:POKES+6,9:POKES+24,15
120 Y=1:Z=INT(1299/N*45-N/2)
130 PRINT A$(XANDY):POKES+4,21
140 FOR T=1TOZ:NEXT:POKES+4,20
150 GETK$:IFK$=""THEN X=Y-X:GOTO130
160 PRINT"{SHFT CLR}":POKES+24,0
```

—Joseph R. Charnetski, Dallas, PA

$449 C-128 Three-Pointer

My program will show football fans a perfect field goal every time, on their C-128!

```
10 PRINT"{SHFT CLR}FIELD GOAL BY MICHAEL B
   LACKMON":FORG=3584TO3839:POKEG,.:NEXT
20 FORX=1TO4:READS,A:FORG=S TO A:READP:POK
   EG,P:NEXT:NEXT
30 COLOR0,6:SPRCOLOR3,7:GRAPHIC3,1:COLOR1,
   8:COLOR2,2:WIDTH1
```

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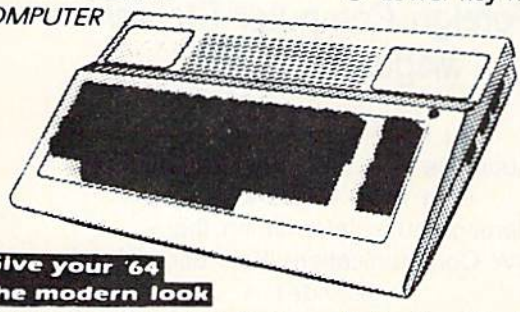
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```
40 DRAW2,0,120TO280,120:FORG=0TO6:DRAW1,G*
   20,120TO+40,199:NEXT:COLOR1,10
50 DRAW1,150,140TO150,160:DRAW1,145,120TO1
   45,135TO155,145TO155,130:SPRSAV1,A$
60 SPRITE1,1,2,,,,1:SPRITE4,1,10:MOVSPR1,2
   0,180:MOVSPR4,95,180:MOVSPR1,90#1
70 FORG=1TO6:GOSUB1000:SPRSAV2,1:GOSUB1000:S
   PRSAVA$,1:NEXT:MOVSPR1,90#0:SPRSAV3,1
80 FORX=45TO135STEP15:MOVSPR4,X#2:FORZ=1TO
   265:NEXTZ,X:SLEEP2:GRAPHIC0
90 SPRITE1,0:SPRITE4,0:MOVSPR4,0#0:END
100 FORX=1TO100:NEXT:RETURN
110 DATA3597,3645,20,,,20,,,21,,,20,,,16,,
    ,168,,,170,,2,42,,2,40,128,2,40,128
120 DATA,20,,,60,,,252,,,252,,,204,,,204,,
    ,255,3661,3710,20,,,20,,,21,,,20,,,16
130 DATA0,,104,,,170,,2,42,,2,40,128,2,40,
    128,,20,,,63,,,51,,,51,,,51,,,51,,,63
140 DATA192,3725,3773,20,0,0,20,0,0,21,32,
    ,20,128,,16,128,,170,48,,168,48,2,40
150 DATA240,2,40,192,2,43,192,,23,,,63,,,6
    0,,,12,,,12,,,12,,,15,3825,3837,32
160 DATA0,,112,,,112,,,112,,,32
```

—MICHAEL BLACKMON, PALESTINE, TX

$44A SIMPLE C-64 PIANO

I programmed this short top-row keyboard piano for quick key response. I find it nice to play simple tunes on. The number row is for sharps and flats, and the second row is for regular notes.

```
10 REM 64 PIANO-ANDREW SENFT
20 S=54272:FORZ=STOS+27:POKEZ,0:NEXT:POKES
   +24,15:POKES+6,127:POKES+4,35
30 F%=1145:DATA62,59,9,8,14,17,16,22,19,25
   ,24,30,33,32,38,35,41,46,43,49,48,54
40 FORZ=0TO127:POKE49152+Z,0:NEXT:FORZ=1TO
   22:READK%:T%=2{UP ARROW}(1/12)*F%+.5
50 F%=T%:POKE49152+K%,T%/256:POKE49216+K%,
   (T%/256-PEEK(49152+K%))*256:NEXT
60 DATA 166,197,189,0,192,201,0,240,247,14
   1,1,212,189,64,192,141
70 DATA 0,212,228,197,240,252,169,0,141,1,
   212,141,0,212,76,128,192,0
80 FORZ=0TO32:READA%:POKE49280+Z,A%:NEXT
90 PRINT"{2 CRSR DNs}SIMPLE PIANO BY ANDRE
   W SENFT":SYS49280
```

—ANDREW SENFT, AUBURN, NY

$44B REFLECTIONS ON THE C-128

This program lets you create some interesting graphics displays by creating "reflections" of your drawings. Use a joystick in port 1 to draw by moving the cursor around the hi-res screen. Draw in the lower-left corner, so the cursor directions will seem correct. The display will be reflected four times around the screen. Clear the screen with the fire-button.

```
10 REM REFLECTIONS - JON ALLEN
20 SLOW:GRAPHIC1,1:COLOR0,1:COLOR1,8
```

```
3Ø COLOR4,1:SCALE1:X=75Ø:Y=25Ø
4Ø J=JOY(1):IFJ=128THENSCNCLR
5Ø IFJ=1ORJ=2ORJ=8THENY=Y+1Ø
6Ø IFJ=6ORJ=5ORJ=4THENY=Y-1Ø
7Ø IFJ=8ORJ=7ORJ=6THENX=X-1Ø
8Ø IFJ=2ORJ=3ORJ=4THENX=X+1Ø
9Ø IFX<ØTHENX=Ø
1ØØ IFX<ØTHENX=Ø
11Ø IFY<ØTHENY=Ø
12Ø IFX>1ØØØTHENX=1ØØØ
13Ø IFY>1ØØØTHENY=1ØØØ
14Ø DRAW1,X,Y:DRAW1,1ØØØ-X,Y
15Ø DRAW1,X,1ØØØ-Y:DRAW1,1ØØØ-X,1ØØØ-Y
16Ø GETA$:IFA$="{LB.}"THENGRAPHICØ:PRINT"{
   CTRL 2}":END
17Ø GOTO4Ø
```

—JON ALLEN, NEWFANE, NY

$44C BASIC SCRAMBLER

Sometimes a need for program security arises, and my Basic Scrambler program offers some measure of protection. To use it, just load it and run it to poke the machine language into memory. Then load the program you want to protect and enter SYS49152,<code1>,<code2>. The codes can be any two different numbers from 0 to 255 (for example, SYS49152,10,20).

After a program is scrambled, save it to disk. It can be loaded as usual, but when you list it, only garbage will be printed to the screen. To unscramble the program, follow the same procedure used to scramble it, using the same codes.

```
5 REM 64 BASIC SCRAMBLER - RICHARD PENN
1Ø FORU=49152TO49346:READQ:POKEU,Q:C=C+Q:N
   EXT
15 IFC<>26195THENPRINT"CHECK DATA!":STOP
2Ø POKE5ØØØØ,Ø:POKE5ØØØ1,Ø:POKE77Ø,164:POK
   E771,192
25 PRINT"{SHFT CLR}{CRSR DN}BASIC SCRAMBLE
   R ENABLED":PRINT"{CRSR DN}SYS 49152, [Ø
   -255], [Ø-255] - TO USE"
3Ø DATA 32,241,183,142,82,195,32,241,183,1
   42,83,195,165,43,133,251,165,44
35 DATA 133,252,16Ø,Ø,32,38,192,177,251,77
   ,82,195,77,83,195,145,251,76
4Ø DATA 22,192,165,251,197,45,2Ø8,6,165,25
   2,197,46,24Ø,12,23Ø,251,165,251
45 DATA 2Ø1,Ø,24Ø,1,96,23Ø,252,96,152,145,
   251,32,5Ø,192,145,251,32,5Ø
5Ø DATA 192,145,251,165,43,133,251,165,44,
   133,252,32,5Ø,192,32,5Ø,192,32
55 DATA 5Ø,192,32,5Ø,192,177,251,2Ø1,Ø,2Ø8
   ,247,32,5Ø,192,165,252,72,165
6Ø DATA 251,72,165,43,133,251,165,44,133,2
   52,1Ø4,145,251,32,5Ø,192,1Ø4,145
65 DATA 251,76,123,227,215,72,152,72,8,16Ø
   ,Ø,177,187,2Ø1,36,24Ø,14,165
7Ø DATA 44,141,8Ø,195,169,255,133,44,169,1
   ,141,81,195,4Ø,1Ø4,168,1Ø4,76
75 DATA 165,244,169,131,141,48,3,169,192,1
   41,49,3,173,81,195,2Ø1,1,2Ø8
```

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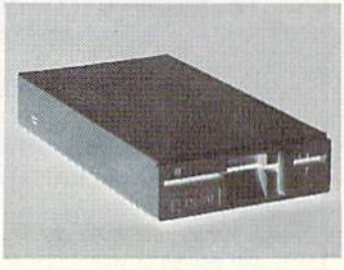
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```
8Ø DATA 1Ø,173,8Ø,195,133,44,169,Ø,141,81,
   195,76,131,164,8Ø
```

—Richard Penn, Montreal, Quebec, Canada

$44D Directory Printer

The following program reads each filename in a directory into an array and sorts the filenames alphabetically. You can then print out the directory in one- or two-column format with any Commodore computer and any printer.

```
1 REM DIRECTORY PRINTER-J.R.CHARNETSKI
2 PRINT"{SHFT CLR}WHEN READY PRESS RETURN"

3 GETA$:ON-(A$<>CHR$(13))GOTO3:PRINT"{SHFT
   CLR}WORKING..."
4 DIML$(146):OPEN1,8,Ø,"$Ø":GET#1,A$,B$
5 GET#1,A$,B$:IFB$=""THENCLOSE1:GOTO12
6 GET#1,A$,B$:N=N+1
7 LB=ASC(A$+CHR$(Ø)):HB=ASC(B$+CHR$(Ø))
8 C$=MID$(STR$(LB+256*HB),2)+" "
9 GET#1,D$:IFD$<>""THENC$=C$+D$:GOTO9
1Ø IFN>1THENL$=LEFT$(C$,27):GOTO5
11 L$(N)="Ø{2 SPACEs}"MID$(C$,4):GOTO5
12 FORI=2TON-2:FORJ=I+1TON-1
13 IFMID$(L$(I),7,16)>MID$(L$(J),7,16)THEN
   T$=L$(I):L$(I)=L$(J):L$(J)=T$
14 NEXT:NEXT:X=INT(N/2):PRINT"{SHFT CLR}";

15 INPUT"{CTRL 9}1-2-PRINT 3-DISPLAY 4-END
   ":;A:ONA+1GOTO15,16,17,:END
16 OPEN4,4:CMD4:IFA=2THEN18
17 FORI=1TON:PRINTL$(I):NEXT:GOTO2Ø
18 FORI=1TOX:PRINTL$SPC(7)L$(X+I)
19 NEXT:IFN=XTHENPRINTSPC(34)L$(N)
2Ø ON-(A=3)GOTO15:PRINT#4:CLOSE4:GOTO15
```

—Joseph R. Charnetski, Dallas, PA ■

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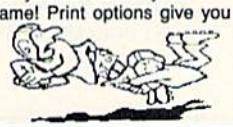
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After you've saved a copy of this utility, load it, then activate it by typing in RUN 63980 in Direct mode. You'll be prompted for the block you want deleted and the increment. If the line numbers are irregularly incremented, use an increment of 1.

While Delete 64 is working, line numbers will quickly flash by in the upper-left corner of your screen as the lines in your program are deleted. A message will advise you when the operation is finished. Then list the program to make sure all the lines in the target range were erased. The whole process occurs with remarkable speed and is fully automatic. Ⓡ

—RICHARD DE A'MORELLI, ARLETA, CA

Listing 1. Delete 64 program.

```
6398Ø REM DELETE 64 BY RICHARD DE A'MORELL
      I
63981 POKE53281,1:POKE5328Ø,6:B=82Ø:H=256:
      PRINT"{SHFT CLR}{CRSR DN}{CTRL 7)";
63982 INPUT"ERASE FROM LINE# ";F:INPUT"{8
      SPACEs}TO LINE# ";T
63983 INPUT"INCREMENT (1-255)";I:IFI<1ORI>
      H-1ORF<1ORF>6398ØORF>TTHEN63991
63984 PRINT"{SHFT CLR}{3 CRSR DNs} {UP ARR
      OW}ERASING":POKEB+4,I
63985 POKEB,F/H:POKEB+1,F-PEEK(B)*H:POKEB+
      2,T/H:POKEB+3,T-PEEK(B+2)*H
63986 H=256:B=82Ø:D=PEEK(B)*H+PEEK(B+1)
63987 PRINT"{HOME}{CRSR DN}{CTRL 7}"D"{CTR
      L 2}":IFD=>PEEK(B+2)*H+PEEK(B+3)THEN
      63991
63988 L=PEEK(B+1)+PEEK(B+4):IFL>H-1THENPOK
      EB,PEEK(B)+1:L=L-H
63989 POKEB+1,L
6399Ø PRINT"GOTO63986":POKE631,19:FORX=ØTO
      2:POKE632+X,13:NEXT:POKE198,4:END
63991 PRINT"{SHFT CLR}{2 CRSR DNs}{CTRL 7}
      DELETE 64 FINISHED!":FORJ=BTOB+4:POK
      EJ,Ø:NEXT:END ■
```


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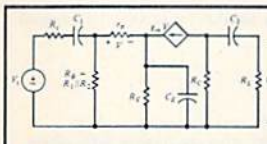
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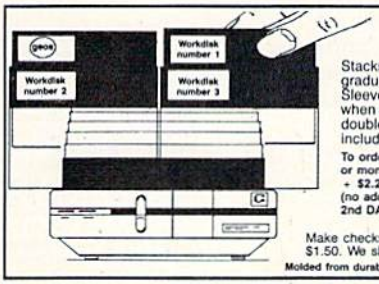
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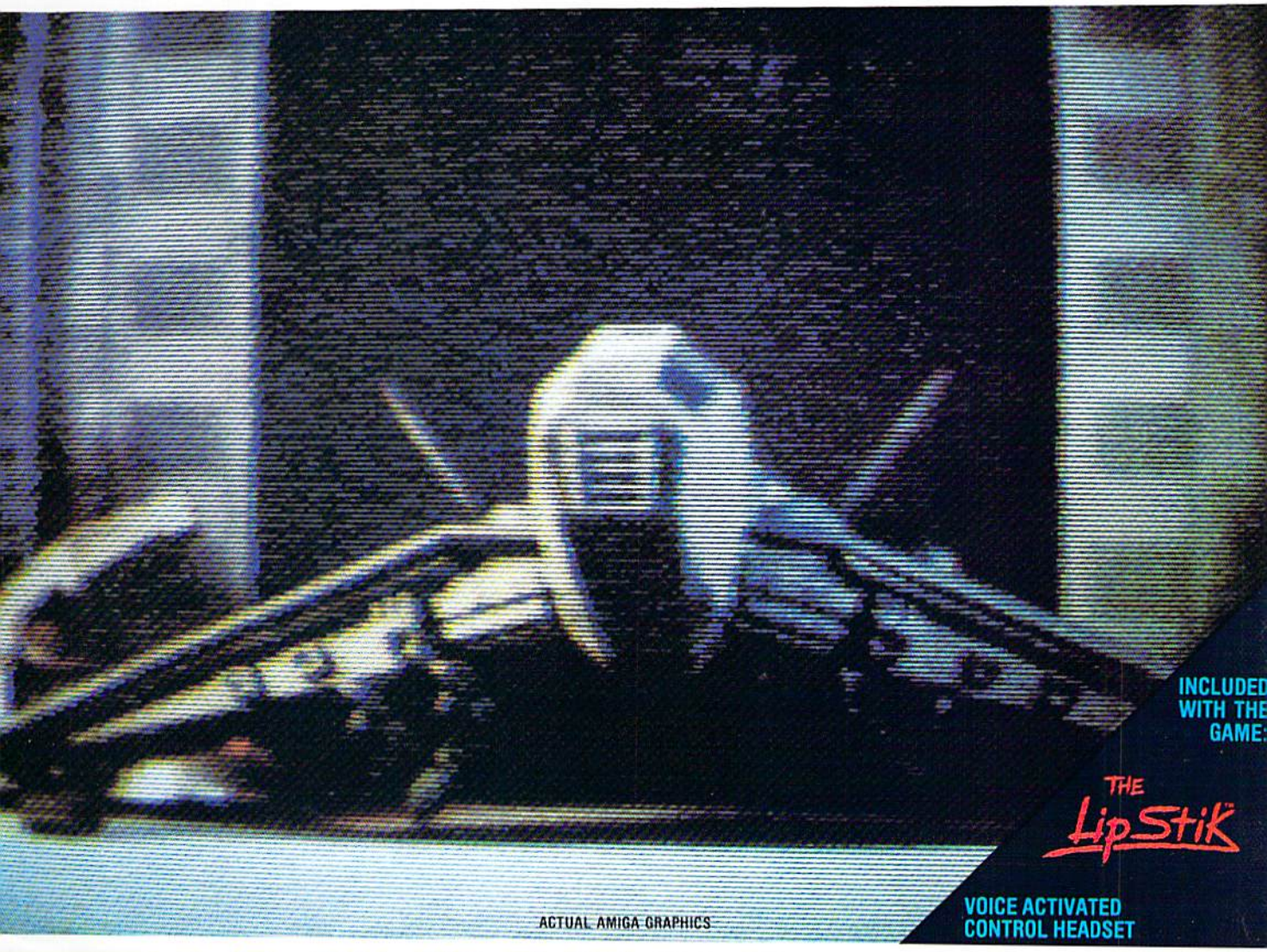
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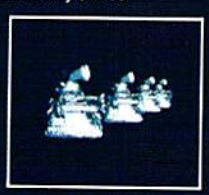


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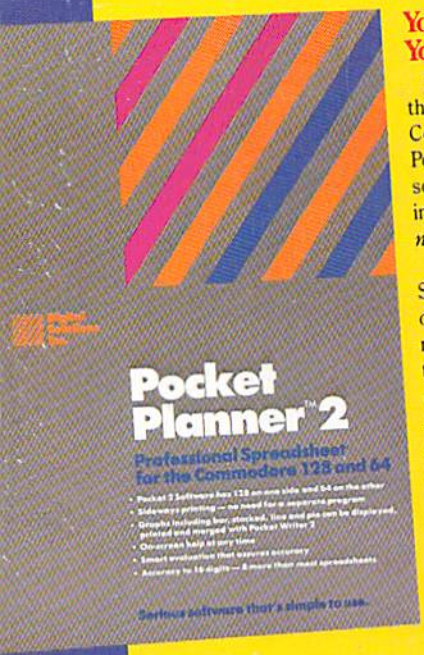
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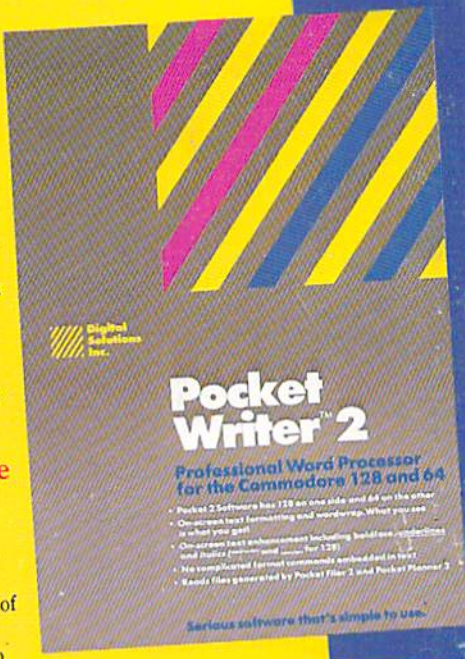
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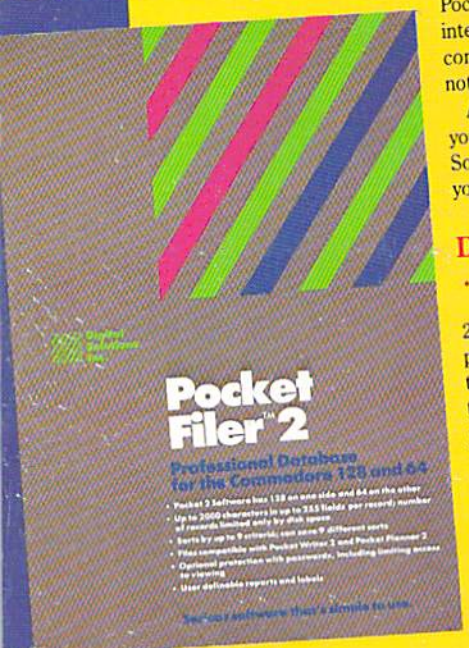
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